SLV-CA30/GA35/GA55/GA65/ GF85/SA33/SP70/SP100
RMT-V286/V286A/V286B/V286C

SERVICE MANUAL

E Model
SLV-GA35PS/GA55PS/GF85PS

ME Model
SLV-GA35ME/GA35SG/GA55ME/GA55SG

Middle East Model
SLV-GA65MJ

Philippine Model
SLV-GA35PL/GA55PL/GF85PL

Russian Model
SLV-SP70R/SP100R

Taiwan Model
SLV-CA30TW/GA35TW/GF85TW/SA33TW

Thailand Model
SLV-GA35TH/GA55TH/GF85TH

Photo: SLV-GF85

S MECHANISM

- **Refer to the SERVICE MANUAL of VHS MECHANICAL ADJUSTMENTS VI for MECHANICAL ADJUSTMENTS. (9-921-647-11)**

* The abbreviations of CA30, GA35, GA55, GA65, GF85, SA33, SP70 and SP100 contained in this service manual are indicated when these models are common to all their corresponding models as given below.

Abbreviated model name	CA30	GA35	GA55	GA65	GF85	SA33	SP70	SP100
All model names SLV-	CA30TW	GA35ME GA35PL GA35PS GA35SG GA35TH GA35TW	GA55ME GA55PL GA55PS GA55SG GA55TH	GA65MJ	GF85PL GF85PS GF85TH GF85TW	SA33TW	SP70R	SP100R

SPECIFICATIONS

System
EXCEPT CA30/GA35: PL, TW/GA55PL/GF85: PL, TW/SA33:
Color system
PAL, MESECAM, NTSC 3.58, NTSC 4.43
RF output signal
UHF channel 30 to 90
(B/G, D/K)
Aerial out
75-ohm asymmetrical aerial socket
CA30/GA35: PL, TW/GA55PL/GF85: PL, TW/SA33:
Format
VHS NTSC standard
Video recording system
Rotary head helical scanning FM system
Video heads
Double azimuth two heads
Video signal
NTSC color, EIA standards
Maximum recording/playback time
9 hrs. in EP mode (with T-180 tape)
Fast-forward and rewind time
Approx. 4 min. 30 sec. (with T-120 tape)
Tape speed (GA55/GA65/GF85: PL, TW/SP70)
SP: 33.35 mm/s
EP: 11.11 mm/s
LP: 16.67 mm/s, playback only

Tuner section: CA30/GA35: PL, TW/GA55PL/GF85: PL, TW/SA33
RF output channel
VHF channel 3 or 4
Antenna
75-ohm antenna terminal for VHF/UHF

Inputs and outputs
LINE 1 IN (EXCEPT CA30/GA35/SA33)
VIDEO IN, phono jack (1)
Input signal: 1 Vp-p, 75 ohms, unbalanced, sync negative
AUDIO IN (MONO), phono jack (1) (GA55/GA65/SP70)
AUDIO IN, phono jack (2) (GF85/SP100)
Input level: 327 m Vrms
Input impedance: more than 47 kilohms

– Continued on next page –

VHS PAL NTSC4.43 VIDEO CASSETTE RECORDER

MICROFILM

SONY®

LINE 1 OUT
VIDEO OUT, phono jack (1)
Output signal: 1 Vp-p, 75 ohms, unbalanced, sync negative
AUDIO OUT (MONO), phono jack (1)
(EXCEPT GF85/SP100)
AUDIO OUT, phono jack (2)
(GF85/SP100)
Standard output: 327 mVrms
Load impedance: 47 kilohms
Output impedance: less than 10 kilohms

General

Power requirements
110 – 240 V AC, 50/60 Hz
(EXCEPT CA30/GA35TW/GF85TW/SA33)
110 V AC, 60 Hz
(CA30/GA35TW/GF85TW/SA33)
Power consumption
10 W (CA30/GA35: PL, TW/GA55PL/GF85: PL, TW/SA33)
12 W
(EXCEPT CA30/GA35: PL, TW/GA55PL/GF85: PL, TW/SA33)
Operating temperature
5 °C to 40 °C
Storage temperature
–20 °C to 60 °C
Dimensions
Approx. 355 × 96 × 293 mm (w/h/d)
Including projecting parts and controls
Mass
Approx. 3.8 kg

Supplied accessories

Remote commander (1)
R6 (Size AA) batteries (2)
Aerial cable (1)
(EXCEPT CA30/GA35: PL, TW/GA55PL/GF85: PL, TW/SA33)
Audio /video cable (3-phono to 3- phono) (1)
(GF85/SP100)
75-ohm coaxial cable with F type connectors (1)
(CA30/GA35: PL, TW/GA55PL/GF85: PL,TW/SA33)

Design and specifications are subject to change without notice.

- **Feature Difference**

SLV- / Feature	CA30TW GA35TW SA33TW	GA35ME GA35PS GA35SG GA35TH	GA35PL	GA55ME GA55PS GA55SG GA55TH SP70R	GA55PL	GF85PL	GF85PS GF85TH	GF85TW	SP100R
HEAD/CH	2/2	2/2	2/2	4/4	4/4	6/6	6/6	6/6	4/4
NTSC (3.58) (REC/PB)	×/○	×/×	×/○	○/○	○/○	○/○	○/○	○/○	○/○
(4.43) (REC/PB)	×/×	×/○	×/×	○/○	×/×	×/×	○/○	×/×	○/○
MESECAM (REC/PB)	×/○	×/○	×/○	○/○	○/○	×/×	○/○	×/×	○/○
REC (NTSC) (SP/EP)	×/×	×/×	×/×	○/○	○/○	○/○	○/×	○/○	○/×
(PAL) (SP/LP)	×/×	×/×	×/×	○/○	○/○	×/×	○/×	×/×	○/×
PLAY (NTSC) (SP/EP)	○/○	○/○	○/○	○/○	○/○	○/○	○/×	○/○	○/×
(PAL) (SP/LP)		○/○○/○	○/○	○/○	○/○	×/×	○/×	×/×	○/×
RCA LINE IN/OUT	×/○ (2P)	×/○ (2P)	×/○ (2P)	○ (2P)/ ○ (2P)	○ (2P)/ ○ (2P)	○ (3P)/ ○ (3P)	○ (3P)/ ○ (3P)	○ (3P)/ ○ (3P)	○ (3P)/ ○ (3P)
MODULATOR SYSTEM	13ch	G/K	3/4ch	G/K	3/4ch	3/4ch	G/K	13ch	G/K
REMOTE COMMANDER	RMT-V286C	RMT-V286A	RMT-V286A	RMT-V286	RMT-V286	RMT-V286	RMT-V286	RMT-V286B	RMT-V286

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer:

1. Check the area of your repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splashes and bridges.
2. Check the interboard wiring to ensure that no wires are "pinched" or contact high-wattage resistors.
3. Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.
4. Look for parts which, though functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.
5. Check the B+ voltage to see it is at the values specified.

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

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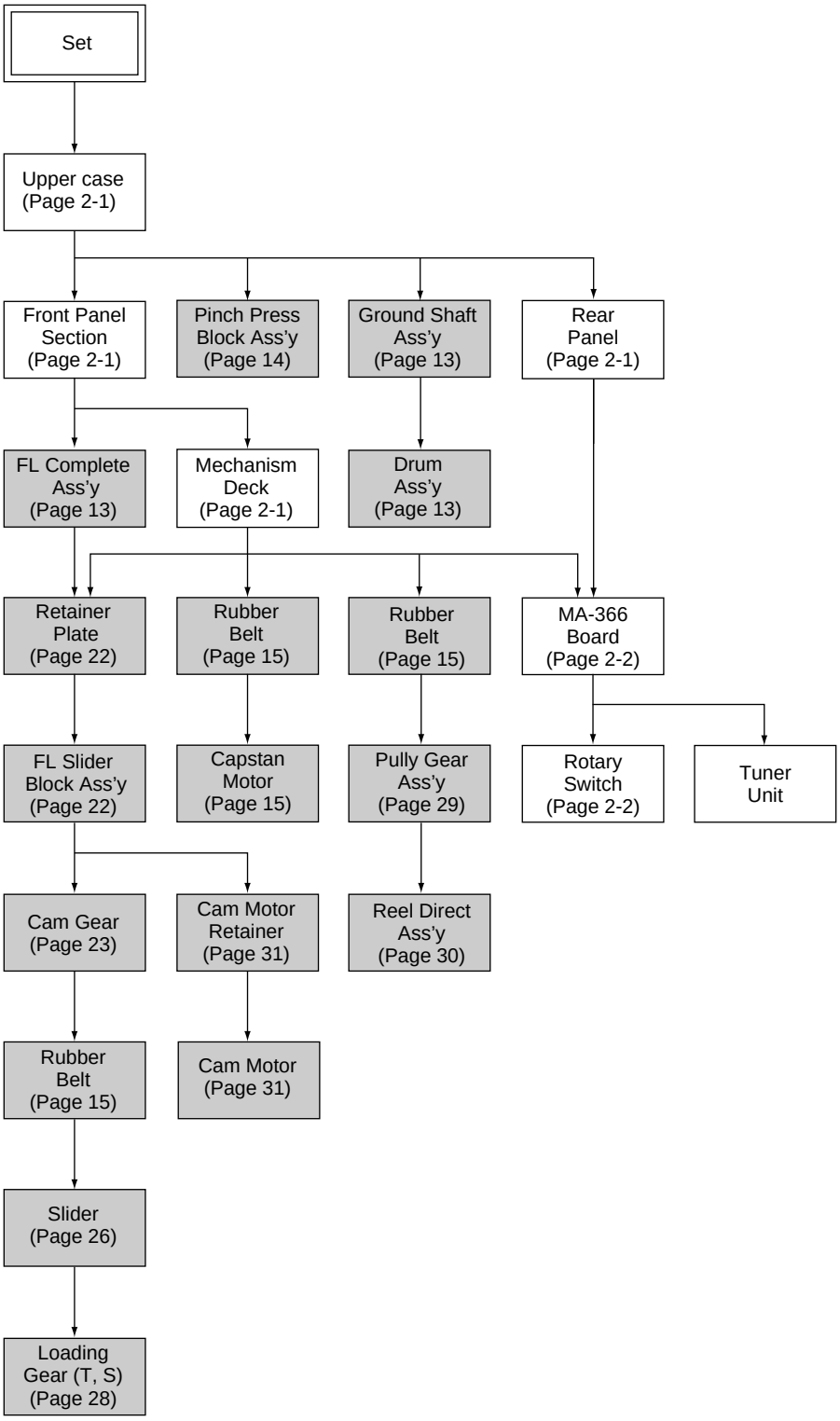
SERVICE NOTE

1. DISASSEMBLY

• This set can be disassembled in the order shown below.

Note: Pages in ▭ indicated pages in the SERVICE MANUAL.
Pages in ▭ indicated pages in the VHS MECHANICAL ADJUSTMENT MANUAL VI.


Set
Upper case (Page 2-1)
Front Panel Section (Page 2-1)
Pinch Press Block Ass'y (Page 14)
Ground Shaft Ass'y (Page 13)
Rear Panel (Page 2-1)
FL Complete Ass'y (Page 13)
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Rubber Belt (Page 15)
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Rubber Belt (Page 15)
Cam Motor (Page 31)
Slider (Page 26)
Loading Gear (T, S) (Page 28)

SECTION 1
GENERAL

This section is extracted from SLV-SP100 instruction manual. (3-867-581-11)

Step 1

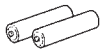
Unpacking

Check that you have received the following items with the VCR:

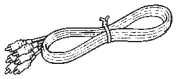
- Remote commander

- Aerial cable

- R6 (Size AA) batteries



- Audio/video cable (3-phono to 3-phono)



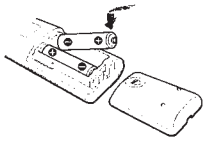
Step 2

Setting up the remote commander

Inserting the batteries

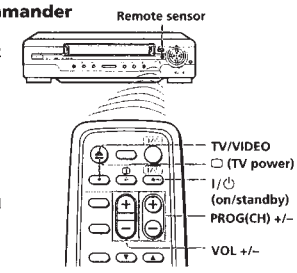
Insert two R6 (size AA) batteries by matching the + and – on the batteries to the diagram inside the battery compartment.

Insert the negative (–) end first, then push in and down until the positive (+) end clicks into position.



Using the remote commander

You can use this remote commander to operate the VCR and a Sony TV. To operate this VCR, point at the remote sensor on the VCR. To operate the TV, point at the remote sensor on the TV. Buttons in the shaded area of the remote commander can be used to operate your Sony TV. If the TV does not have the symbol near the remote sensor, this remote commander will not operate the TV.



To	Press
Turn the TV to standby or active mode	I/⏻ (on/standby)
Turn on the TV power	(TV power)
Increase (+) or decrease (–) the TV volume	VOL +/–
Change the TV programme position	PROG(CH) +/–
Select an input source of the TV either from aerial in or from line in	TV/VIDEO

Notes

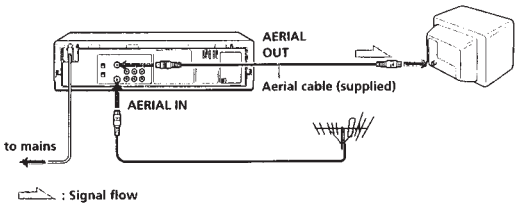
- With normal use, the batteries should last about three to six months.
- If you do not use the remote commander for an extended period of time, remove the batteries to avoid possible damage from battery leakage.
- Do not use a new battery with an old one.
- Do not use different types of batteries.

Step 3

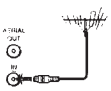
Connecting the VCR

Connect the aerial to your VCR and TV as shown below to watch TV programmes and video pictures on your TV. In addition, if your TV has audio/video (A/V) input jacks, we recommend you connect the VCR to your TV using an audio/video cable to get a better picture and sound.

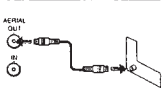
Connecting the aerial



1 Disconnect the aerial cable from your TV and connect it to AERIAL IN on the rear panel of the VCR.



2 Connect AERIAL OUT of the VCR and the aerial input of your TV using the supplied aerial cable.



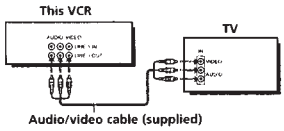
3 Connect the mains lead to the mains.

Additional connections

To a TV that has audio/video input jacks

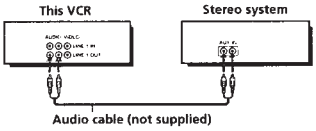
This additional connection improves picture and sound quality. Connect the TV as shown on the right.

If you want to use the Trinitron TV Synchro Play function (see page 14), this connection is necessary. (If your TV has two or more inputs, connect the audio/video cable to the VIDEO IN 1 jacks.)



To a stereo system

You can improve sound quality by connecting a stereo system as shown on the right.



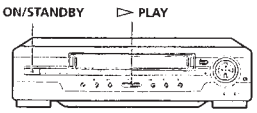
Note

- To listen to playback sounds in stereo, you must use either of the connections above.

Step 4

Tuning your TV to the VCR

If you have connected your VCR to the TV using the audio/video cable, skip this step.



1 ON/STANDBY I/⏻ Press I/⏻ ON/STANDBY to turn on the VCR.

2 Turn on your TV and select a programme position for the video picture.

This channel will now be referred to as the video channel.

Some TV has the programme position, such as 0, that is reserved for a VCR. In this case, select that programme position for the video picture. Refer to the instruction manual of your TV for details.

3 Tune the TV until the video picture on the right is clearly displayed on the TV screen.

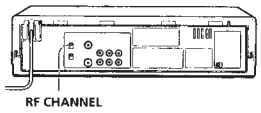
Refer to your TV manual for tuning instructions.

You have now tuned your TV to the VCR. From now on, whenever you want to play a tape, set the TV to the video channel.

If the playback picture does not appear clearly, see "To obtain a clear playback picture" on page 9.

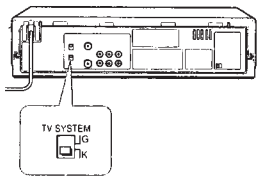
To obtain a clear playback picture

If the playback picture does not appear clearly in step 3 on page 8, turn the RF CHANNEL screw on the rear panel of the VCR with a screwdriver to a position where the TV clearly displays the playback picture.

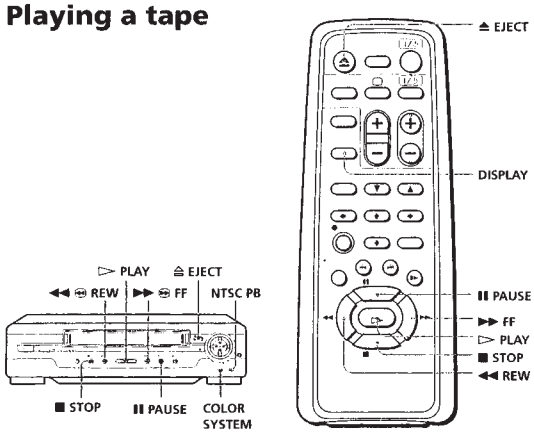


To select the TV system

For your TV to receive the correct signal from your VCR you must set the TV SYSTEM switch on the rear panel of the VCR to either G (for system B/G) or K (for system D/K). If this switch is set to the wrong position, the sound will be distorted.

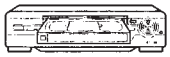


Playing a tape



1 Turn on your TV and set it to the video channel.

2 Insert a tape.



The VCR turns on and starts playing automatically if you insert a tape with its safety tab removed.

3 ▷ PLAY Press ▷ PLAY (if playback did not start in step 2).

When the tape reaches the end, it will rewind automatically.

Additional tasks

To	Press
Stop play	■ STOP
Pause play	II PAUSE
Resume play after pause	II PAUSE or ▷ PLAY
Fast-forward the tape	▶▶ FF (▶▶ ⊖ FF on the VCR) during stop
Rewind the tape	◀◀ REW (◀◀ ⊖ REW on the VCR) during stop
Eject the tape	▲ EJECT

To set the colour system

If streaks appear during playback, set COLOR SYSTEM on the VCR to conform to the system that the tape was recorded in. (Normally set the switch to AUTO.)

If your tape was recorded in	Set COLOR SYSTEM to
PAL	PAL/MESECAM
NTSC	NTSC
MESECAM	PAL/MESECAM

To play an NTSC-recorded tape

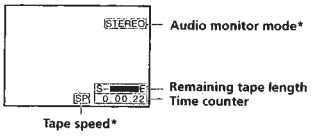
Set NTSC PB on the VCR according to the colour system of your TV.

If your TV is	Set NTSC PB to
PAL	ON PAL TV
NTSC 4.43	NTSC 4.43
NTSC 3.58	NTSC 3.58

continued

To view the tape status on the screen

Press DISPLAY.
The following information appears on the TV screen.



* Appears for a few seconds when the DISPLAY button is pressed and when the mode is changed.

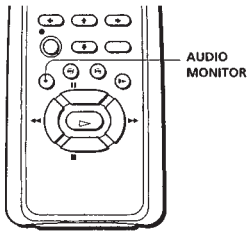
To turn the display off, press DISPLAY again.

Notes

- You can eject a tape even when the power is off. When you press ⏏ EJECT, the VCR turns on automatically. After ejecting the tape, the VCR turns off again.
- When the pause mode lasts for more than approximately five minutes, the VCR will automatically enter the playback mode.
- You can play back tapes recorded in the SP mode only.
- The counter resets to "0:00:00" whenever a tape is inserted.
- The counter stops counting when it comes to a portion with no recording.
- If a tape has portions recorded in both PAL and NTSC systems, the time counter reading will not be correct. This is due to the difference between the counting cycles of the two colour systems.
- Depending on your TV, the following may occur while playing an NTSC-recorded tape:
  - the picture is black and white,
  - the picture shakes,
  - no picture appears on the TV screen,
  - black streaks appear horizontally on the TV screen, and
  - the colour density increases or decreases.

Selecting the sound during playback

Press AUDIO MONITOR to select the sound you want. Each press of the button changes the indicator in the display window. When you play a tape recorded in stereo or with a bilingual sound track, the Hi-Fi indicator in the display window lights up.

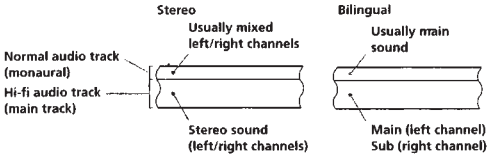


To listen to a		Press AUDIO MONITOR until the display window indicator shows
Stereo tape's	Bilingual tape's	
Stereo sound	Main and sub sounds	L/R
Left channel	Main sound	L
Right channel	Sub sound	R
Standard sound*1	Standard sound*2	No indication

*1 Usually the mixed sound of left and right channels (monaural)
*2 Usually the main sound (monaural)

How sound is recorded on a video tape

The VCR records sound onto two separate tracks. Hi-fi audio is recorded onto the main track along with the picture. Monaural sound is recorded onto the normal audio track along the edge of the tape.



Notes

- To listen to playback sounds in stereo, you must use the AUDIO OUT connections.
- When you play back a tape recorded in monaural, the sound is heard in monaural regardless of the AUDIO MONITOR setting.
- You cannot select the sound to listen to while recording.

continued

Turning on the VCR and TV, and starting playback automatically (Trinitron TV Synchro Play)

You can only use this function if your TV is made by Sony (Trinitron TV).

How to connect to use this function

Connect the VCR and TV with the audio/video cable (see "To a TV that has audio/video input jacks" on page 7.) Be sure to connect the audio/video cable to the VIDEO IN 1 jacks on the TV if the TV has two inputs or more. The TV must be placed where it will respond to the remote commander while you are pointing it at the VCR.

Operation

Make sure that the TV's power is in standby mode.

Press TRINITRON TV SYNCHRO PLAY and hold the remote commander in place for about two seconds.

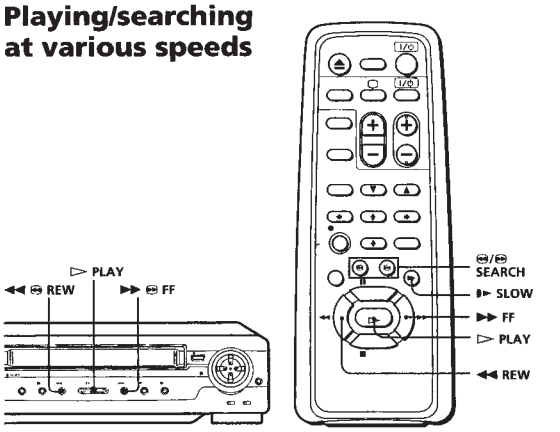
The VCR and TV turn on, and the TV is set to the video channel. If there is a tape in the VCR, playback starts automatically.

Notes

- If the Trinitron TV Synchro Play function does not work properly:
  - Wait a few moments, and press the button again.
  - Replace both of the batteries in the remote commander with new ones, and press the button again.

  Note that this function may not operate some Sony TVs because of the remote commander's signal limitations.
- Do not press TRINITRON TV SYNCHRO PLAY while playing back a video tape. If you do so, the TV's input source will momentarily switch to the TV's tuner.

Playing/searching at various speeds



Playback options	Operation
View the picture during fast-forward or rewind	During fast-forward, hold ▶▶ FF (▶▶ ⏭ FF on the VCR) down. During rewind, hold ◀◀ REW (◀◀ ⏮ REW on the VCR) down.
Play at high speed	• During playback or pause, press ⏭ SEARCH or ⏮ SEARCH. • During playback or pause, hold down ▶▶ FF (▶▶ ⏭ FF on the VCR) or ◀◀ REW (◀◀ ⏮ REW on the VCR). When you release the button, normal playback resumes.
Play in slow motion	During playback or pause, press ▮▸ SLOW.
Rewind and start play	During stop, press ▷ PLAY on the VCR while holding down ◀◀ ⏮ REW on the VCR.

continued

To resume normal playback

Press ▷ PLAY.

Tips

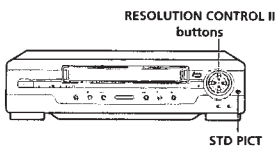
- You can adjust the tracking just by pressing ▼/▲ NORMAL/SLOW/STILL ADJUST while playing a tape.
- Adjust the picture using ▼/▲ NORMAL/SLOW/STILL ADJUST if:
  - streaks appear while playing in slow motion
  - the picture shakes while pausing

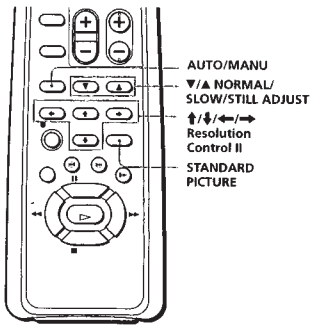
Notes

- Streaks or snow cannot be eliminated completely in the various playback operations, especially in the slow motion mode.
- The sound is muted during these operations.
- On screen symbols may shake while playing or searching at various speeds.

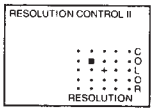
Adjusting the picture

Although the VCR automatically adjusts the picture when playing a tape, distortions or noise may occur if the tape was recorded in poor condition. If so, manually adjust the resolution, colour and tracking.





Adjusting the resolution and colour



1 While playing a tape, press ↑/↓/←/→ RESOLUTION CONTROL II (up/down/left/right button on the VCR) to display the RESOLUTION CONTROL II menu.

The RESOLUTION CONTROL II buttons light up.

2 Press ←/→ RESOLUTION CONTROL II (left/right button on the VCR) to get a clearer picture.

3 Press ↑/↓ RESOLUTION CONTROL II (up/down button on the VCR) to get the best picture colour.

Wait for several seconds until the RESOLUTION CONTROL II menu disappears.

To resume the automatic adjustment

Press STANDARD PICTURE on the remote commander (STD PICT on the VCR) so that the RESOLUTION CONTROL II buttons turn off.

Adjusting the tracking

Press ▼/▲ TRACKING NORMAL/SLOW/STILL ADJUST to obtain the best possible picture. The distortion should disappear as you press one of the two buttons. If you cannot get a clear picture with manual adjustment, press TRACKING AUTO/MANU to return to automatic adjustment.

continued

About Adaptive Picture Control (APC)

Adaptive Picture Control (APC) automatically improves recording and playback quality by adjusting the VCR to the condition of the video heads and tape.

APC playback

The APC function automatically works on all types of tapes, including rental tapes and tapes that were not recorded with APC.

APC recording

Whenever you insert a tape and first start recording, the VCR adjusts to the tape using the APC function. This adjustment is retained until the tape is ejected.

Tip

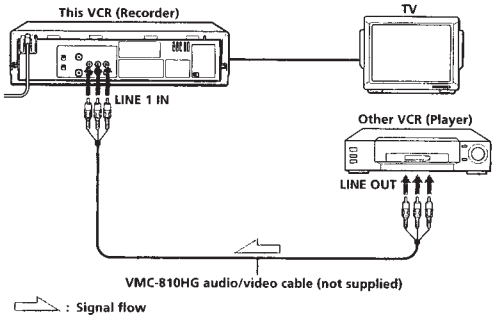
- Adjust the picture using ▼/▲ NORMAL/SLOW/STILL ADJUST if:
  - streaks appear while playing in slow motion
  - the picture shakes while pausing

Notes

- The auto tracking function works automatically when you play back a tape just after inserting it.
- There is a delay of a few seconds before the VCR actually starts recording while the VCR analyses the tape. To avoid the delay, first set the VCR to recording pause and press ● REC to have the VCR analyse the tape. After ten seconds, press ❚❚ PAUSE to start recording immediately. If you press ❚❚ PAUSE before ten seconds, the APC function is cancelled.
- Sufficient picture quality may not be obtained when playing back tapes recorded on another VCR or tapes in poor condition.
- When a tape recorded with the copyguard system is played back, intermittent distortion may appear in the upper portion of the picture. However, this is not a malfunction of the VCR.

Editing with another VCR

How to connect to record on this VCR



Tip

- If the other VCR is a monaural type and connected to the LINE 1 IN jacks on this VCR, the sound is recorded only on the channel whose jack is connected to the audio plug. To record on both right and left channels, connect the audio plugs to AUDIO R/L jacks using the VMC-910HG (3-phono to 2-phono) audio/video cable (not supplied).

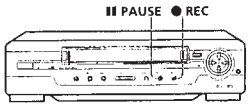
Notes

- Make sure you connect the plugs to jacks of the same colour.
- If you connected this unit to both the LINE IN and LINE OUT jacks of the other VCR, select the input correctly to prevent a humming noise.
- Make sure you set the CONNECT LINE-1 switch to OTHERS.

continued

Operation (when recording on this VCR)

You can make a copy of a tape using this VCR for recording or playback. The VCR cannot record TV programmes directly since it does not have a TV tuner.



Before you start editing

- Turn on your TV and set it to the video channel.

1 Insert a source tape with its safety tab removed into the other (playback) VCR. Search for the point to start playback and set it to playback pause.

2 Insert a tape with its safety tab in place into this (recording) VCR. Search for the point to start recording and press II PAUSE.

3 Press ● REC on this VCR to set it to recording pause.

4 To start editing, press the II PAUSE buttons on both VCRs at the same time.

To stop editing

Press the ■ STOP buttons on both VCRs.

To check the remaining tape length

Press DISPLAY.
The white bar indicates the approximate length of the tape recording.

To turn the display off, press DISPLAY again.

To save a recording

To prevent accidental erasure, break off the safety tab as illustrated. To record on a tape again, cover the tab hole with adhesive tape.

Tips

- To edit more precisely, press the II PAUSE buttons on the VCRs to release pause.
- To cut out unwanted scenes while editing, press II PAUSE on this VCR when an unwanted scene begins. When that scene ends, press II PAUSE again to resume recording.

Note

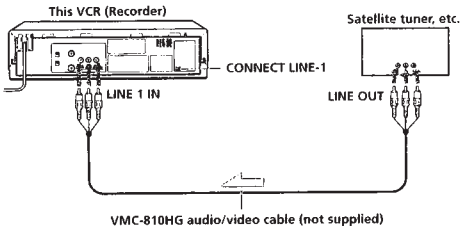
- You can record tapes only in SP mode.

Synchronised recording

The Synchronised Recording feature enables you to record from the connected equipment such as a satellite tuner, a cable TV decoder or a TV that has a timer function. Once you set the timer on the other equipment, the VCR will start recording the programme synchronised with the timer.

How to connect to use this function

Connect the other equipment to the LINE 1 IN jacks of this VCR.



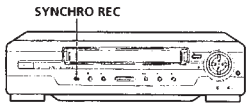
: Signal flow

Setting the CONNECT LINE-1 switch

When you connect the other equipment to the LINE 1 IN jacks, set the CONNECT LINE-1 switch on the rear of the VCR following the table below to allow better signal transmission to your TV.

If the VCR is connected to	Set the CONNECT LINE-1 switch to
TV	TV
Satellite, cable TV decoder, etc.	OTHERS

To prepare the Synchronised recording



1 Set the timer on the equipment to the time of the programme you want to record, then turn the equipment off.

2 Insert a tape with its safety tab in place. Make sure the tape is longer than the total recording time.

3 Hold SYNCHRO REC down for more than two seconds.

The SYNCHRO REC button lights up and the VCR stands by for recording.

The VCR automatically turns on and starts recording when it receives audio/video signals from the connected equipment.

To cancel the Synchronised recording

Press SYNCHRO REC so that the button's light turns off.

To stop recording

Press ■ STOP while recording.

The VCR automatically stops recording when the tape reaches the end or when the other equipment stops transmitting the audio/video signals.

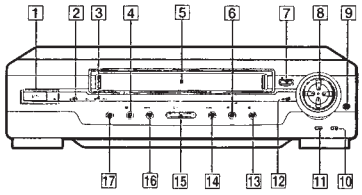
Notes

- Some TVs or other equipment automatically turn off in a certain time if you do not operate it after it turns on with the timer. In this case the Synchronised Recording also stops automatically.
- The Synchronised Recording starts and stops according to the signals from the connected equipment. Refer also to the instruction manual of the connected equipment for its timer function.
- You can record tapes only in SP mode.

Index to parts and controls

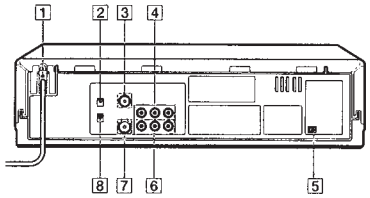
Refer to the pages indicated in parentheses ( ) for details.

Front panel



1 I/⏻ ON/STANDBY switch/indicator (8)
2 Tape operation indicator
3 HiFi/L/R indicators (13)
4 ■ STOP button (11)
5 Tape compartment
6 ❚❚ PAUSE button (11)
7 ⏏ EJECT button (11)
8 RESOLUTION CONTROL II buttons (17)
9 STD PICT (standard picture) button (17)
10 NTSC PB switch (11)
11 COLOR SYSTEM switch (11)
12 Remote sensor (5)
13 ● REC (record) button (20)
14 ▶▶ FF (fast-forward) button (11, 15)
15 ▷ PLAY button (10)
16 ◀◀ REW (rewind) button (11, 15)
17 SYNCHRO REC (record) button (23)

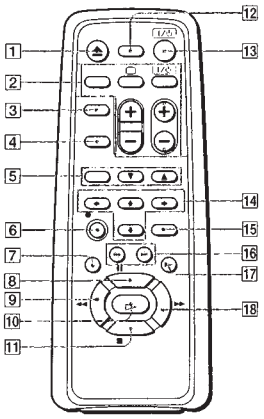
Rear panel



1 Mains lead (6)
2 RF (Radio Frequency) CHANNEL screw (9)
3 AERIAL OUT connector (6)
4 LINE 1 IN AUDIO R/L/VIDEO jacks (19)
5 CONNECT LINE-1 switch (22)
6 LINE 1 OUT AUDIO R/L/VIDEO jacks (7)
7 AERIAL IN connector (6)
8 TV SYSTEM switch (9)

continued

Remote commander

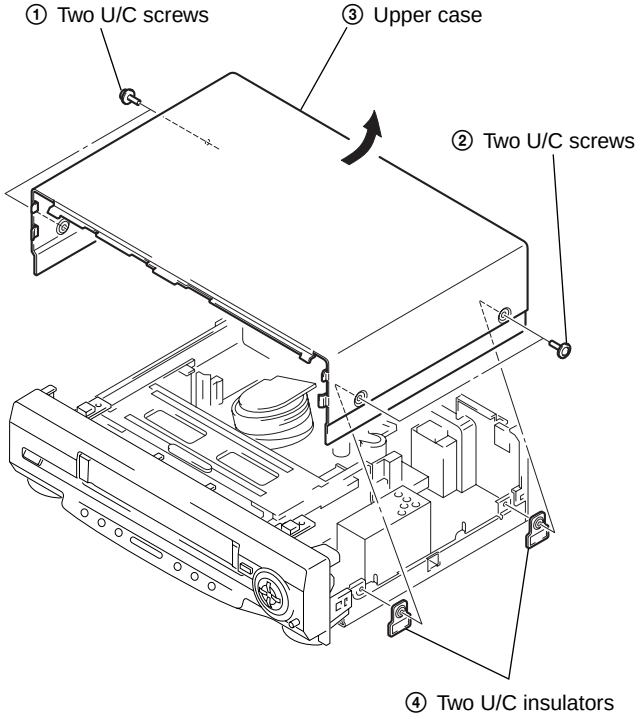


1 ⏏ EJECT button (11)
2 TV control buttons *(Only for TV)* (5)
TV/VIDEO
▭ (TV power)
I/⏻ (on/standby)
VOL (volume) +/–
PROG (CH) +/–
3 TV/VIDEO button *(This button doesn't work with this unit.)*
4 DISPLAY button (12, 20)
5 TRACKING buttons
AUTO/MANU (17)
▼/▲ NORMAL/SLOW/STILL ADJUST (17)
6 ● REC (record) button (20)
7 AUDIO MONITOR button (13)
8 ❚❚ PAUSE button (11)
9 ◀◀ REW (rewind) button (11, 15)
10 ▷ PLAY button (10)
11 ■ STOP button (11)
12 TRINITRON TV SYNCHRO PLAY button (14)
13 I/⏻ (on/standby) switch (8)
14 ↑/↓/←/→ Resolution Control II buttons (17)
15 STANDARD PICTURE button (17)
16 ◀◀/▶▶ SEARCH buttons (15)
17 ▮▶ SLOW button (15)
18 ▶▶ FF (fast-forward) button (11, 15)

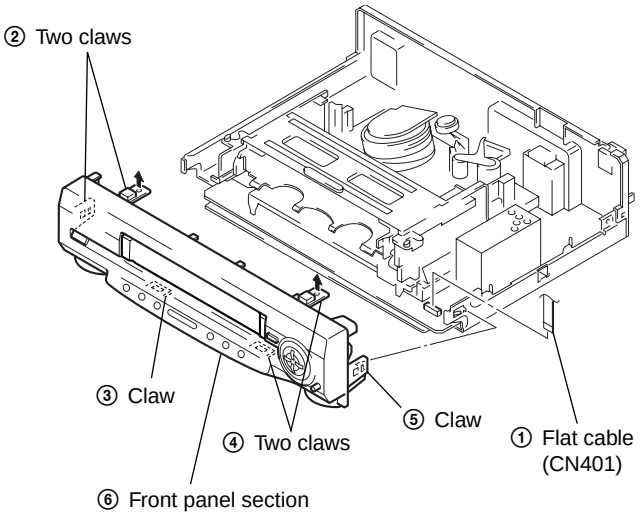
SECTION 2
DISASSEMBLY

Note: Follow the disassembly procedure in the numerical order given.

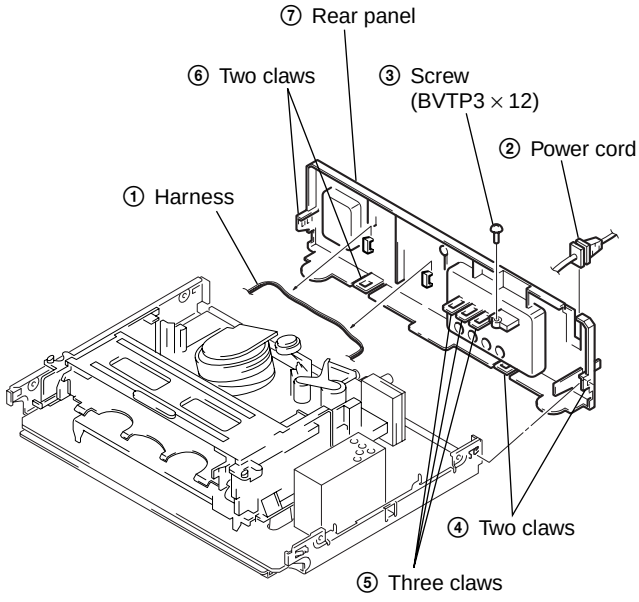
2-1. UPPER CASE REMOVAL



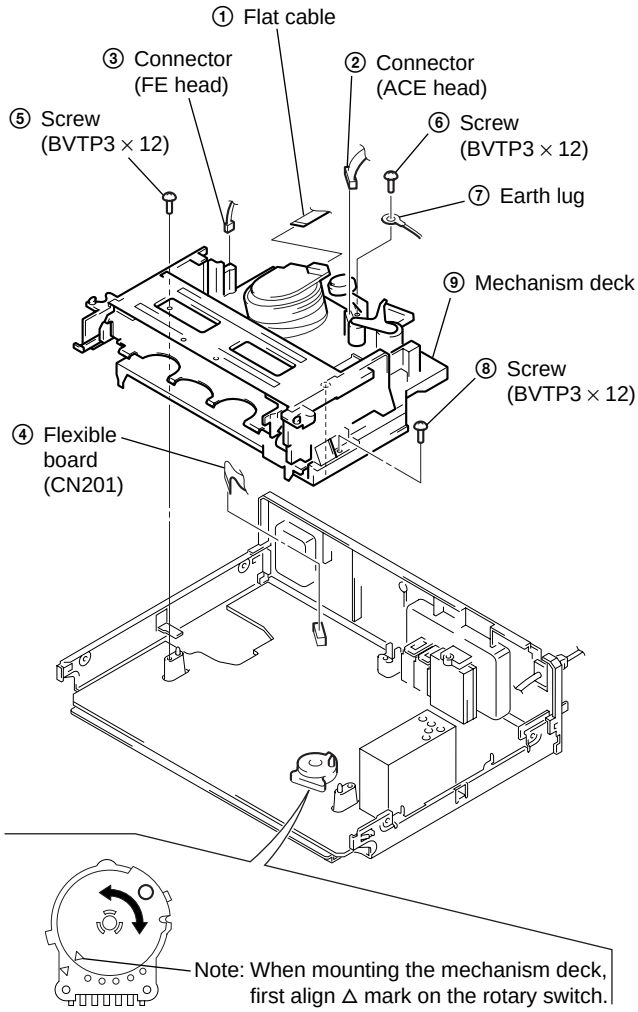
2-2. FRONT PANEL SECTION REMOVAL



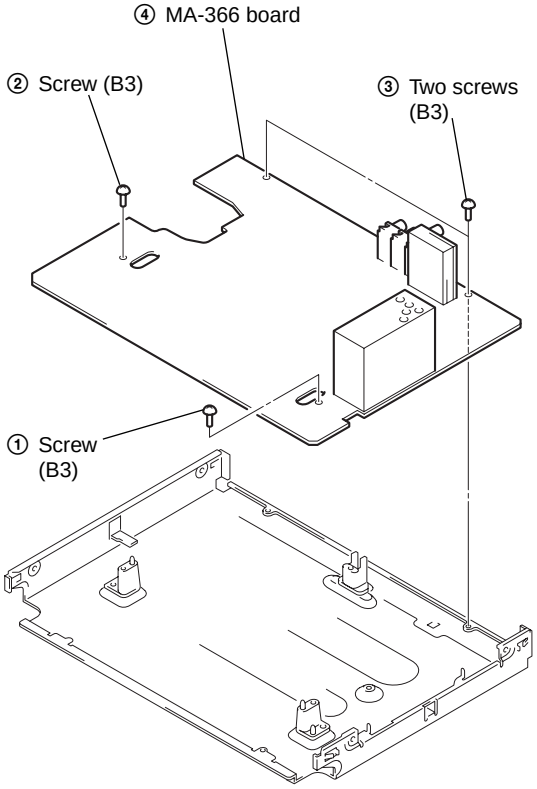
2-3. REAR PANEL REMOVAL



2-4. MECHANISM DECK REMOVAL


① Flat cable
③ Connector (FE head)
② Connector (ACE head)
⑤ Screw (BVTP3 × 12)
⑥ Screw (BVTP3 × 12)
⑦ Earth lug
⑨ Mechanism deck
⑧ Screw (BVTP3 × 12)
④ Flexible board (CN201)
Note: When mounting the mechanism deck, first align △ mark on the rotary switch.

2-5. MA-366 BOARD REMOVAL



2-6. INTERNAL VIEWS

Drum assembly (M901) (DZH-71E-R)
1-772-147-11 (CA30/GA35TW/SA33)
Drum assembly (M901) (DZH-89B-R)
1-772-148-11 (GA35: ME, PL, PS, SG, TH/GA55/GA65/SP70)
Drum assembly (M901) (DZH-91B-R)
1-772-149-11 (GF85: PS, TH/SP100)
Drum assembly (M901) (DZH-90B-R)
1-772-351-11 (GF85: PL, TW)

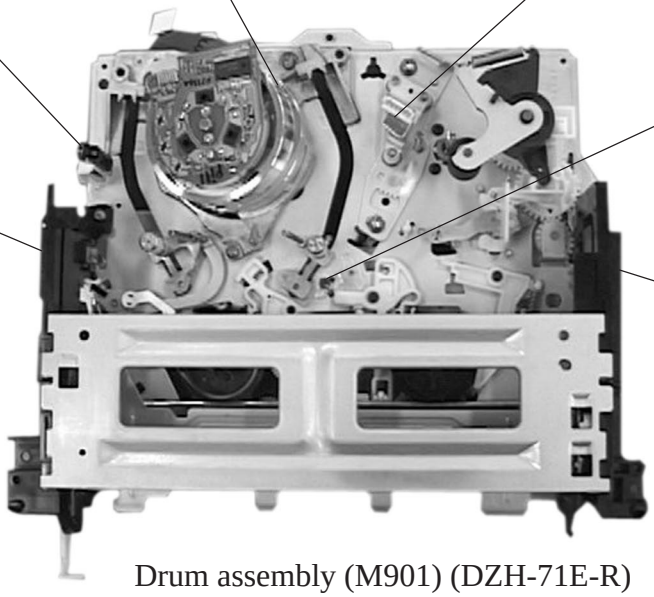
ACE head assembly
A-6759-620-A

FE head
1-500-144-11

D001
Tape top/end LED
8-719-048-26

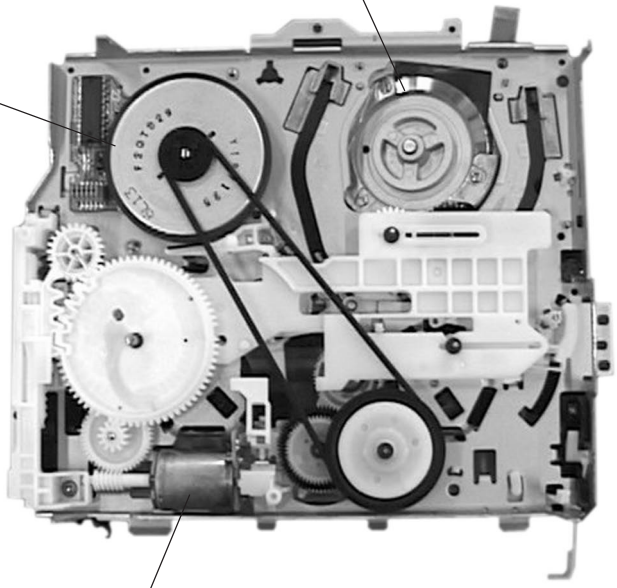
Q002
Tape top sensor
8-729-042-88

Q001
Tape end sensor
8-729-042-88



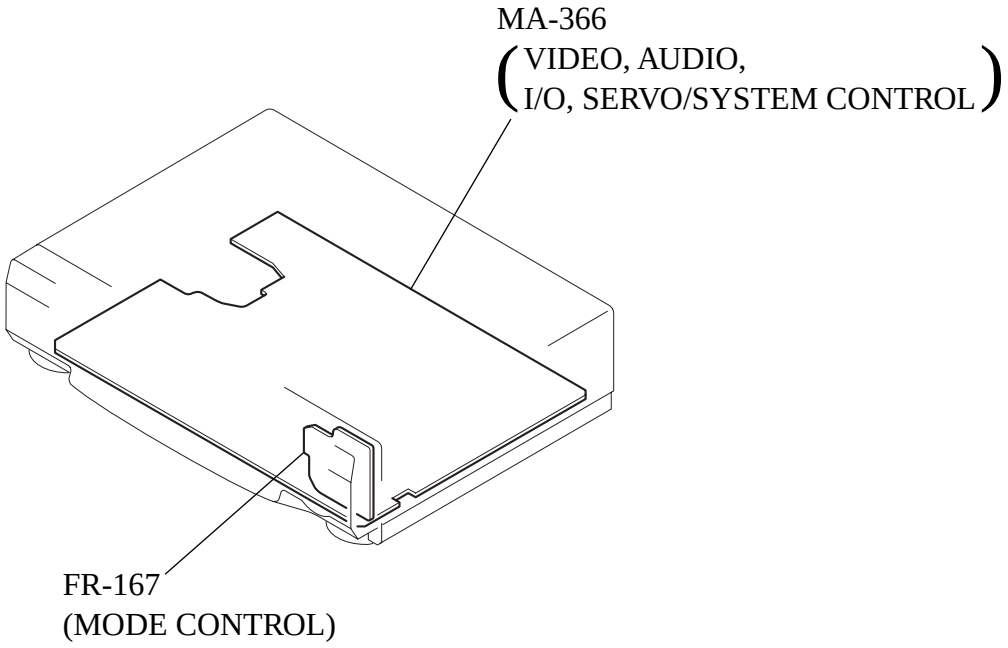
Drum assembly (M901) (DZH-71E-R)
1-772-147-11 (CA30/GA35TW/SA33)
Drum assembly (M901) (DZH-89B-R)
1-772-148-11 (GA35: ME, PL, PS, SG,TH/GA55/GA65/SP70)
Drum assembly (M901) (DZH-91B-R)
1-772-149-11 (GF85: PS, TH/SP100)
Drum assembly (M901) (DZH-90B-R)
1-772-351-11 (GF85: PL, TW)

Capstan motor
1-698-971-11



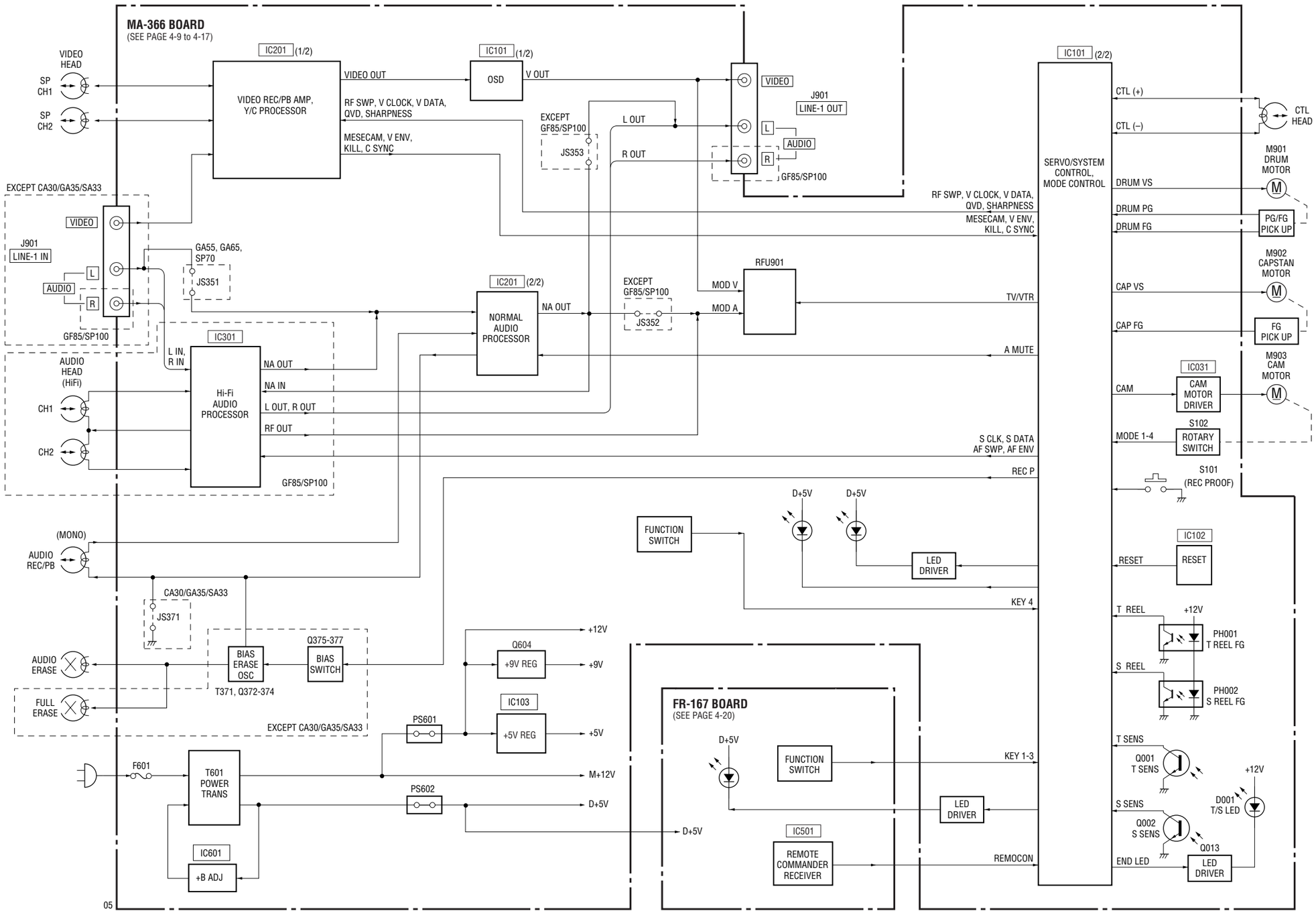
Cam motor assembly
X-3947-577-1

2-7. CIRCUIT BOARDS LOCATION

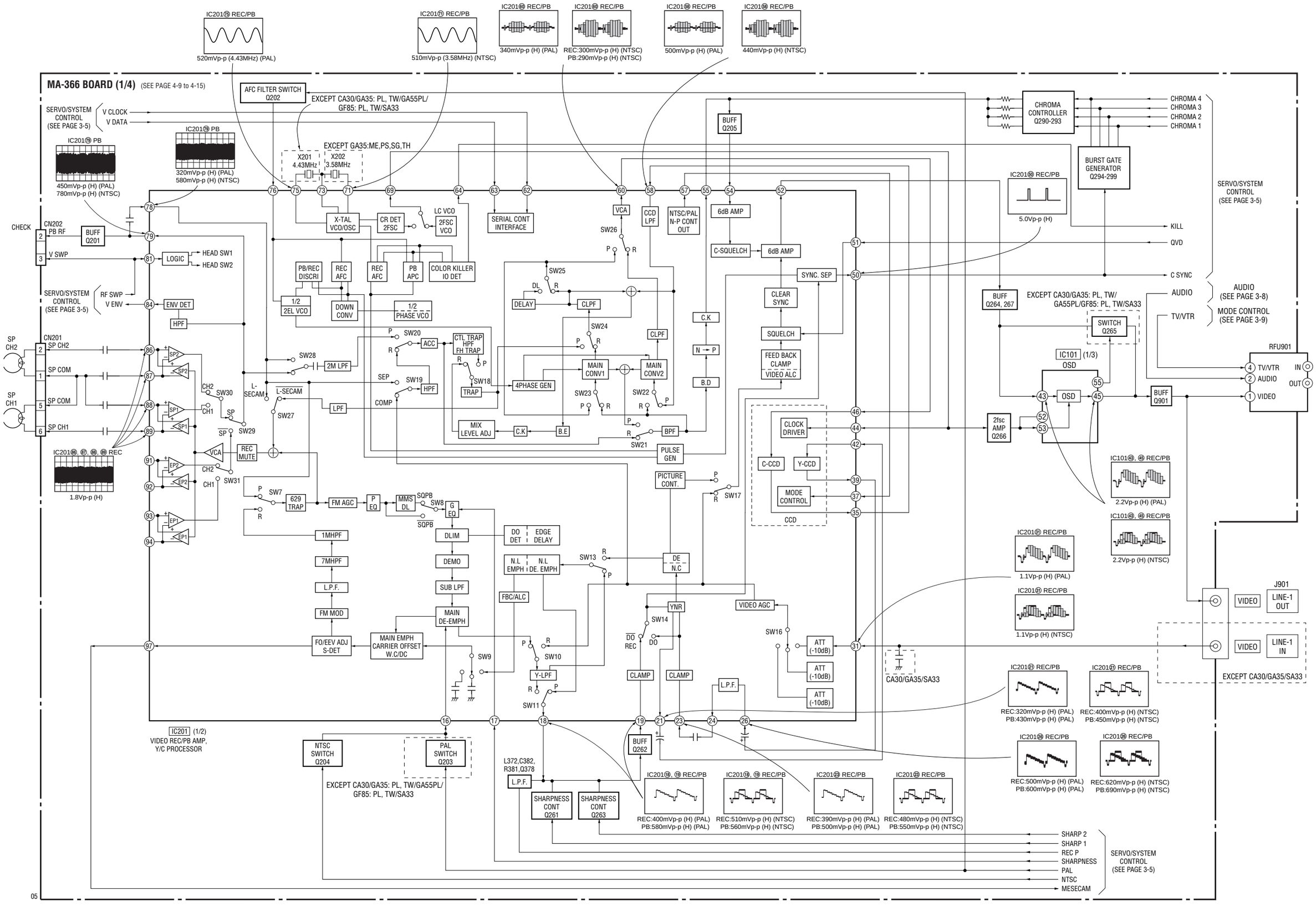


SECTION 3
BLOCK DIAGRAMS

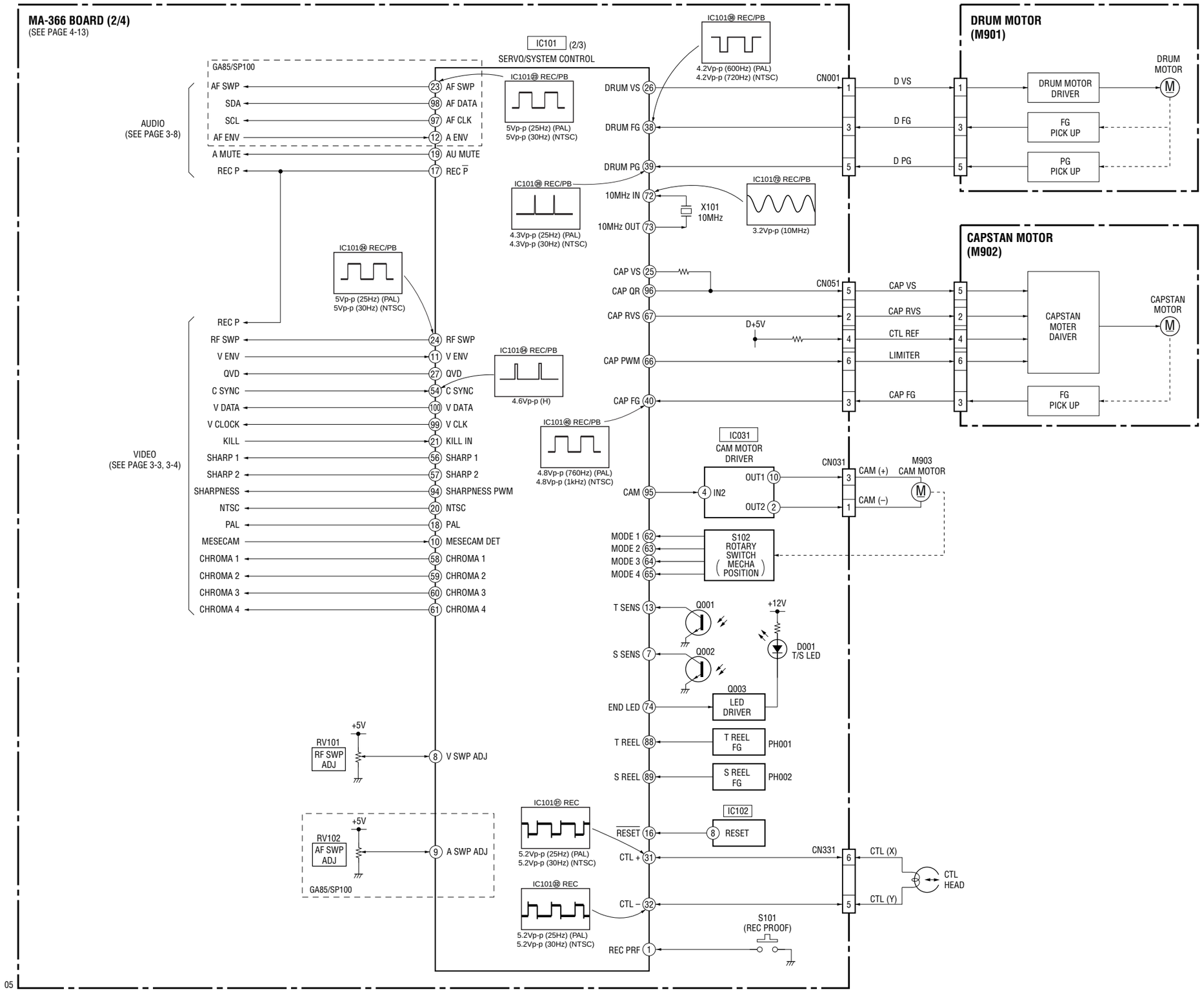
3-1. OVERALL BLOCK DIAGRAM



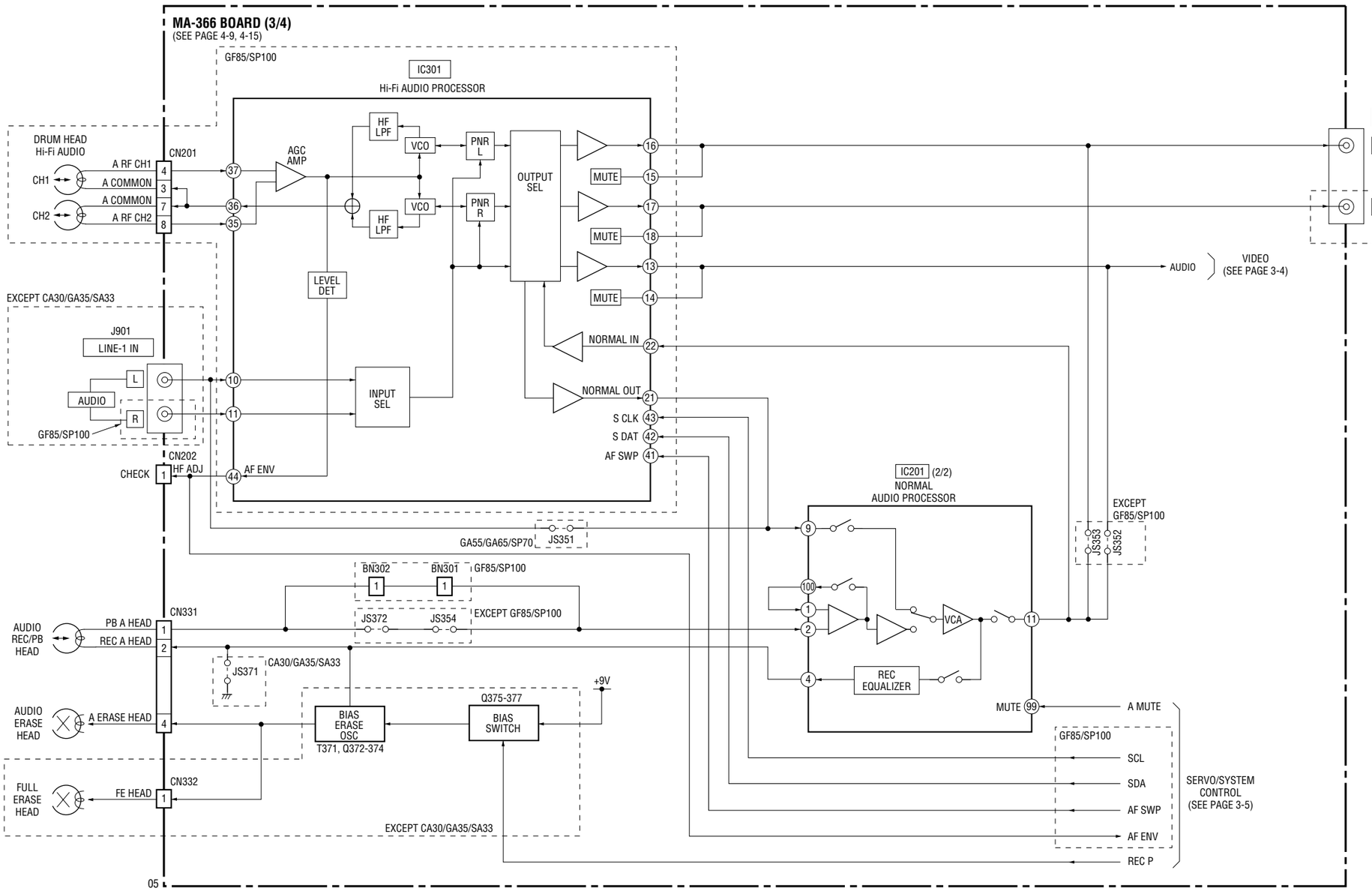
3-2. VIDEO BLOCK DIAGRAM



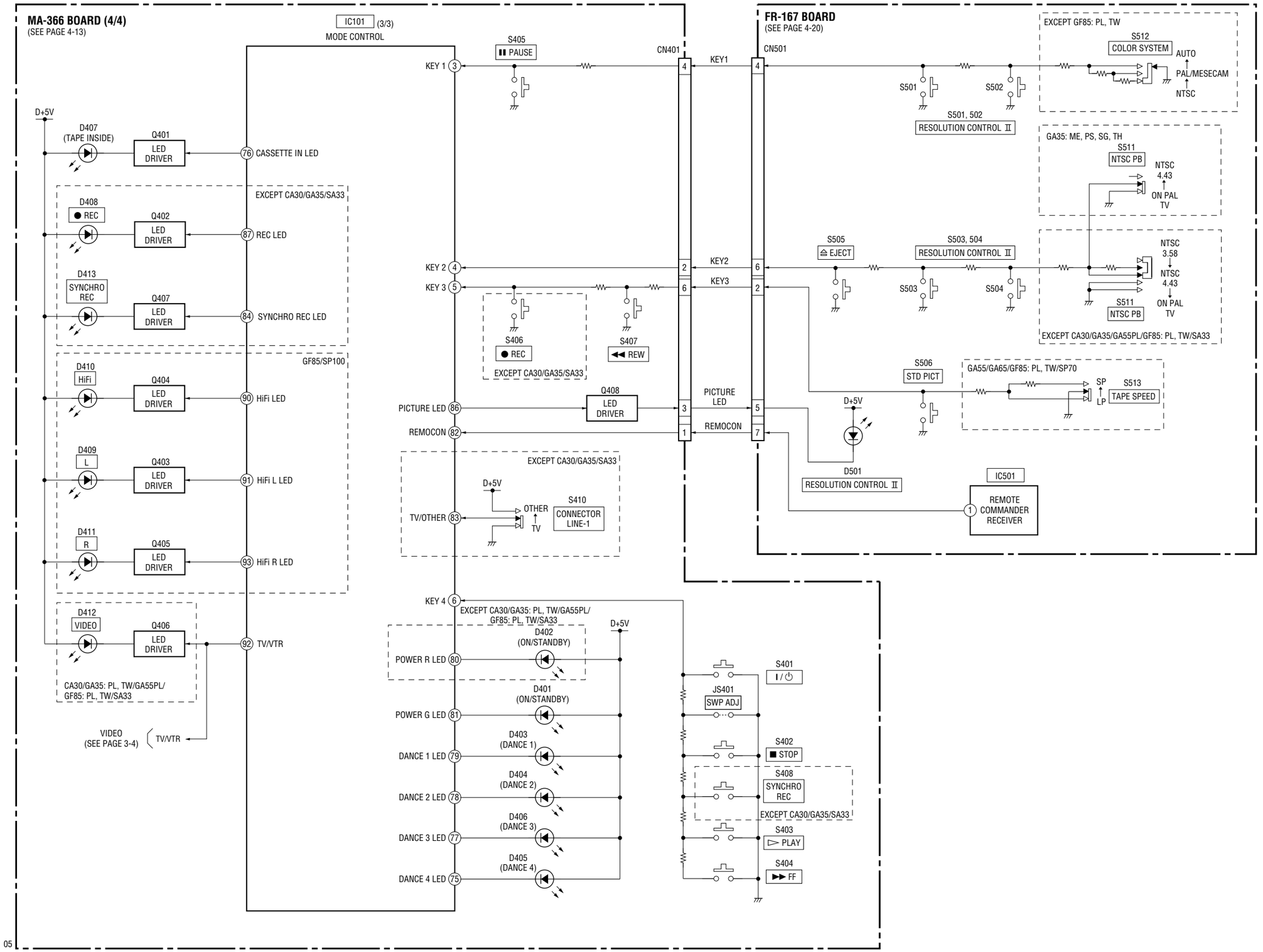
3-3. SERVO/SYSTEM CONTROL BLOCK DIAGRAM



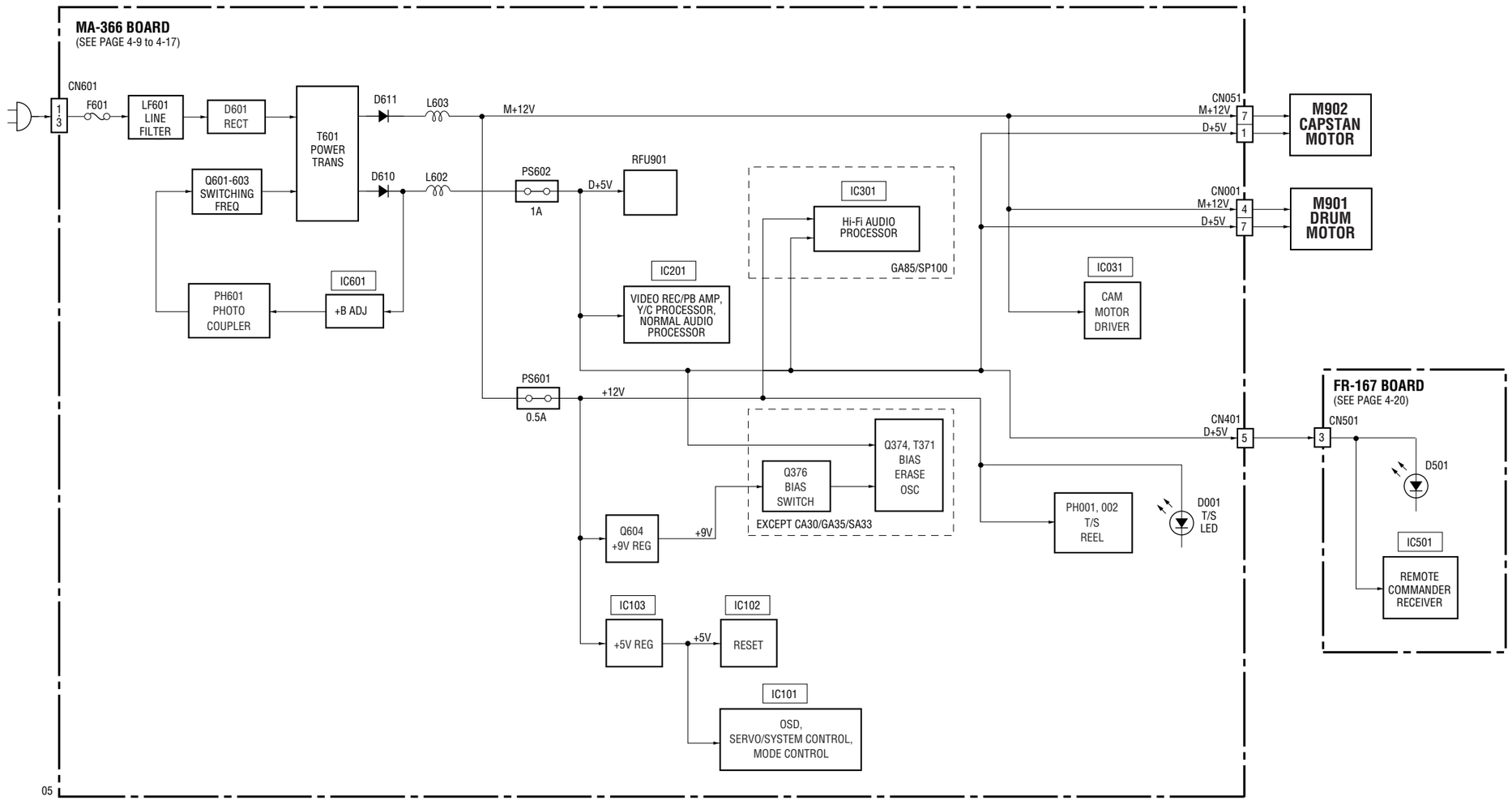
3-4. AUDIO BLOCK DIAGRAM



3-5. MODE CONTROL BLOCK DIAGRAM



3-6. POWER BLOCK DIAGRAM



SECTION 4
PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

THIS NOTE IS COMMON FOR PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS.
(In addition to this, the necessary note is printed in each block.)

For printed wiring board:

- ○——— : indicates a lead wire mounted on the component side.
- ●——— : indicates a lead wire mounted on the printed side.
- ○ : Through hole.
- ■ : Parts mounted on the conductor side.
- ▒▒▒ : Pattern from the side which enables seeing.

(The other layers' patterns are not indicated.)

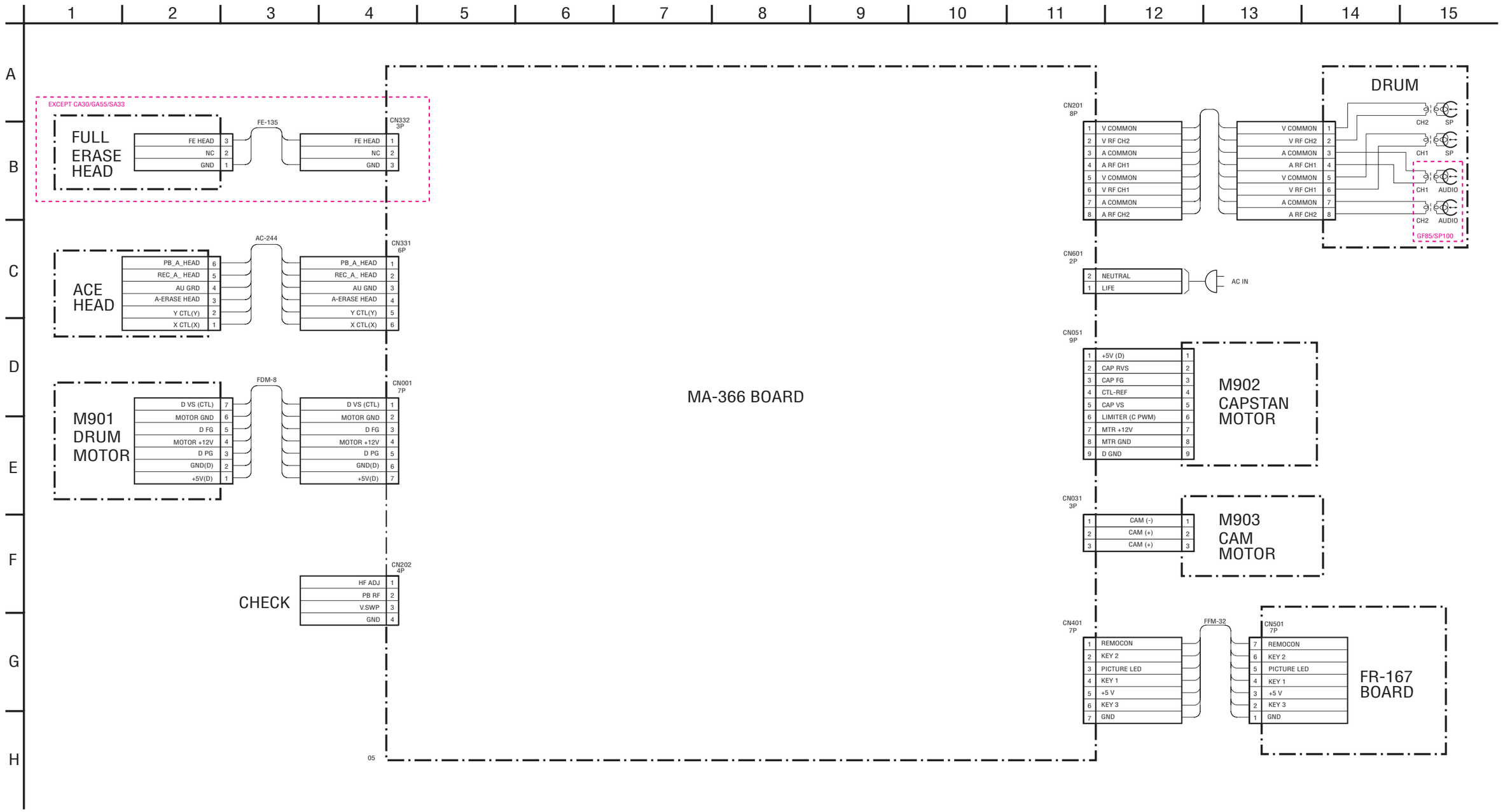
For schematic Diagram:

- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the heat.
- All resistors are in ohms, $^{1}/_{4}$ W (Chip resistors : $^{1}/_{10}$ W) unless otherwise specified.
  kΩ : 1000Ω, MW : 1000kΩ.
- All capacitors are in µF unless otherwise noted. pF : µµF 50V or less are not indicated except for electrolytics and tantalums.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- ⊣▭⊢ : nonflammable resistor.
- ⊣▭⊢ : fusible resistor.
- ▭ : panel designation.
- △ : internal component.
- ▭ : adjustment for repair.
- B + : B+ Line.
- B − : B– Line.
- Circled numbers refer to waveforms.
- Voltages are dc between measurement point.
- Readings are taken with a color-bar signal input.
- Readings are taken with a digital multimeter (DC 10MW).
- Voltage variations may be noted due to normal production tolerances.

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

When indicating parts by reference number, please include the board name.

4-1. FRAME SCHEMATIC DIAGRAM

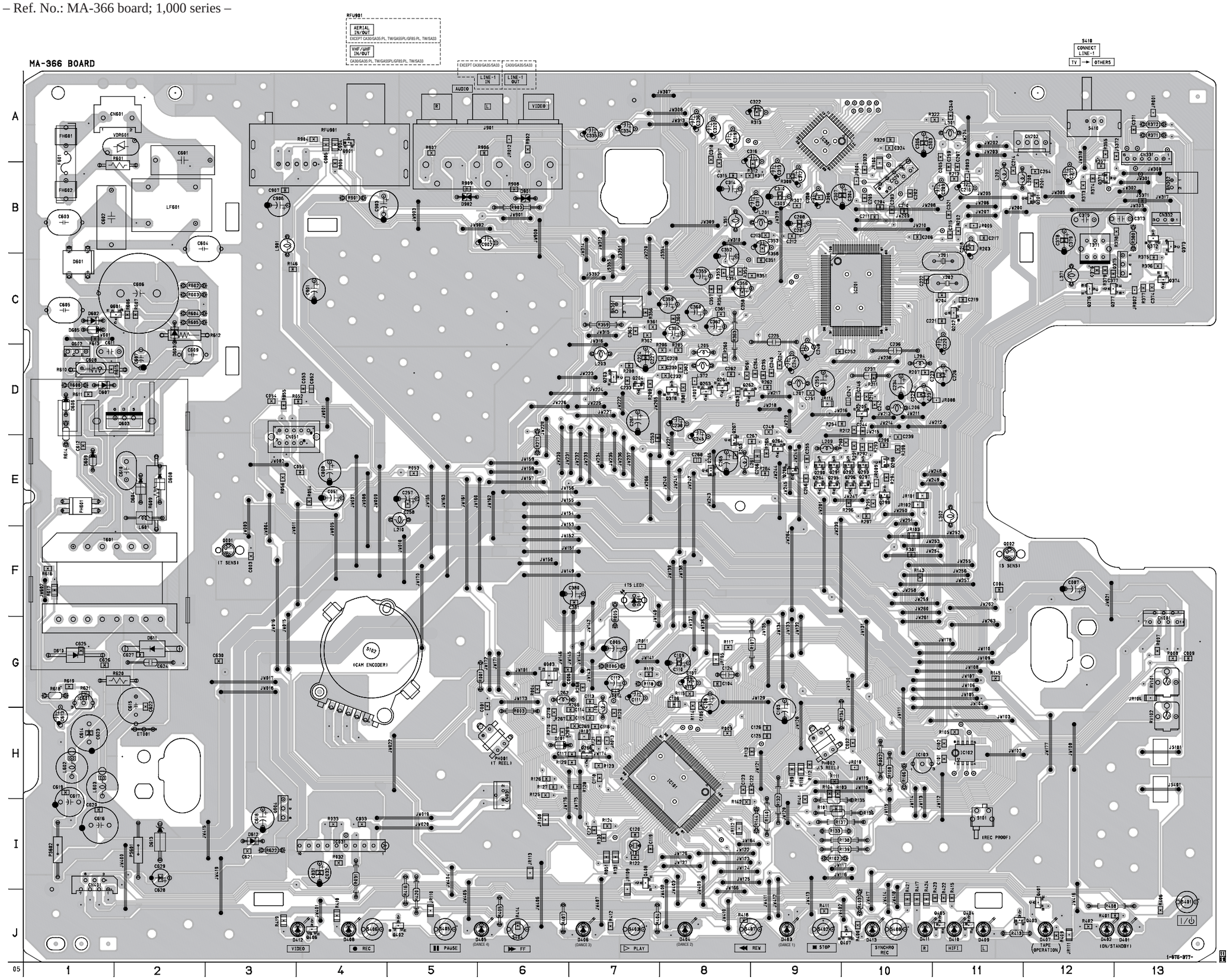


4-2. PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

MA-366 (VIDEO, AUDIO, I/O, SERVO/SYSTEM CONTROL) PRINTED WIRING BOARD

– Ref. No.: MA-366 board; 1,000 series –

There are few cases that the part isn't mounted in this model is printed on this diagram.



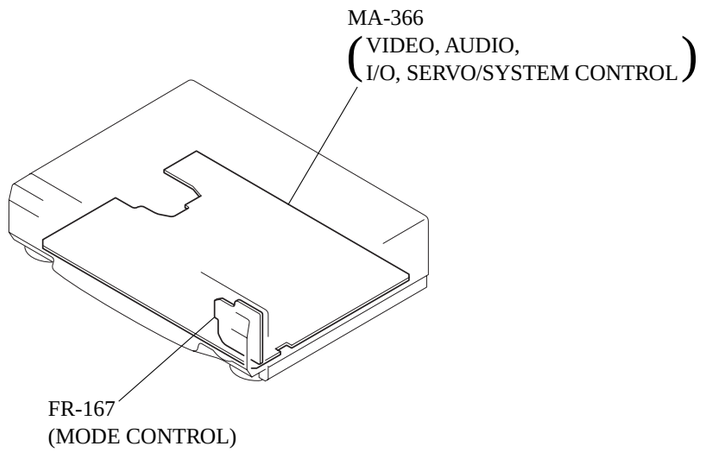
MA-366 BOARD

CN001	G-13
CN031	H-6
CN051	A-3
CN201	B-10
CN202	A-11
CN331	A-13
CN332	B-13
CN401	I-1
CN601	A-2

D001	F-7
D101	H-6
D401	I-1
D402	J-12
D403	J-9
D404	J-8
D405	J-6
D406	J-7
D407	J-12
D408	J-4
D409	J-11
D410	J-11
D411	J-10
D412	J-4
D413	J-10
D601	C-1
D602	C-1
D603	C-2
D604	E-2
D605	C-1
D606	D-1
D607	D-1
D608	E-2
D609	E-1
D610	G-1
D611	G-2
D612	I-3
D613	I-2
D901	B-6
D902	B-5

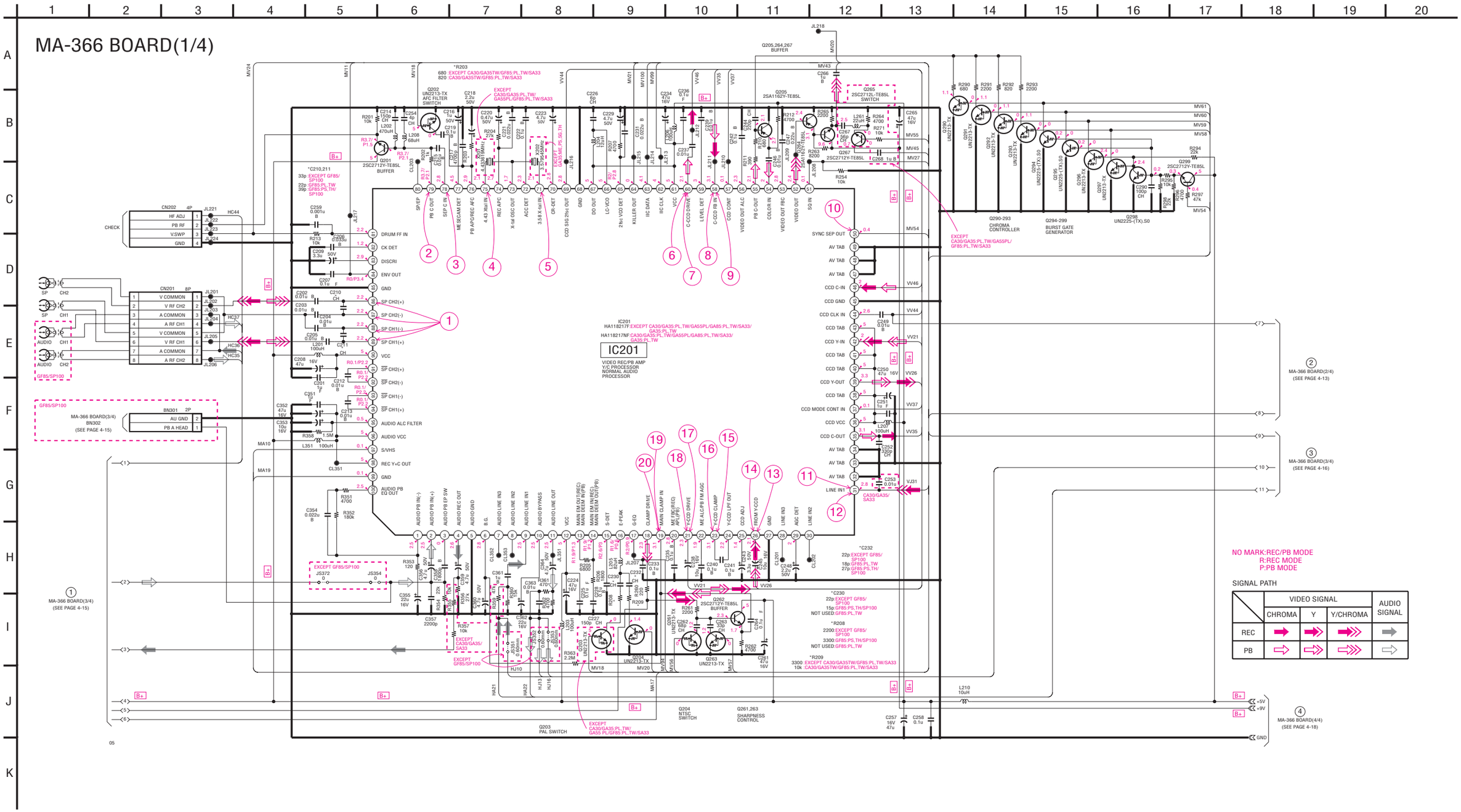
IC031	I-4
IC101	H-8
IC102	H-11
IC103	H-10
IC201	C-10
IC301	A-9
IC601	G-1

Q001	F-3
Q002	F-11
Q003	G-6
Q201	B-11
Q202	C-11
Q203	D-7
Q204	D-7
Q205	D-10
Q261	D-8
Q262	D-8
Q263	D-8
Q264	E-9
Q265	E-8
Q266	H-7
Q267	E-8
Q290	E-9
Q291	E-9
Q292	E-10
Q293	E-10
Q294	E-9
Q295	E-9
Q296	E-10
Q297	E-10
Q298	E-10
Q299	E-10
Q371	B-12
Q372	B-13
Q373	B-13
Q374	C-13
Q375	C-12
Q376	C-12
Q377	C-12
Q378	D-8
Q401	J-12
Q402	J-5
Q403	J-11
Q404	J-11
Q405	J-11
Q406	J-4
Q407	J-10
Q408	I-7
Q601	C-1
Q602	D-1
Q603	D-2
Q604	I-3
Q901	A-4



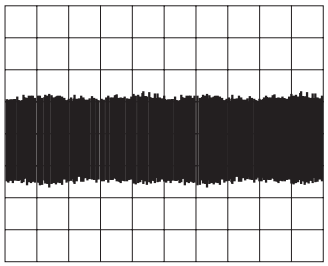
MA-366 (VIDEO, AUDIO) SCHEMATIC DIAGRAM • See page 4-5 for printed wiring board.

– Ref. No.: MA-366 board; 1,000 series –



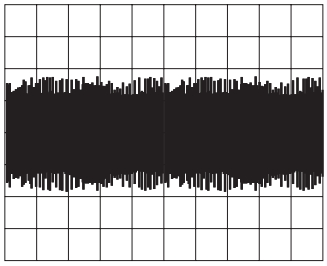
• Waveforms

❶ IC201 ㊽, ㊼, ㊽, ㊾ REC



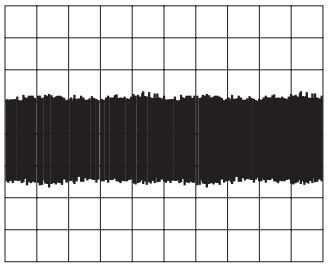
1.8 Vp-p (H)

❷ IC201 ㊾ PB



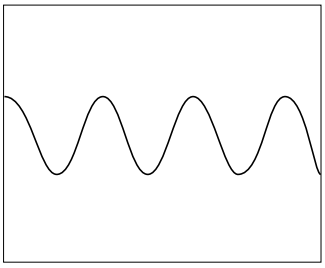
450 mVp-p (H) (PAL)
780 mVp-p (H) (NTSC)

❸ IC201 ㊽ PB



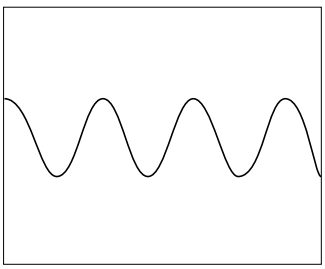
320 mVp-p (H) (PAL)
580 mVp-p (H) (NTSC)

❹ IC201 ㊺ REC/PB



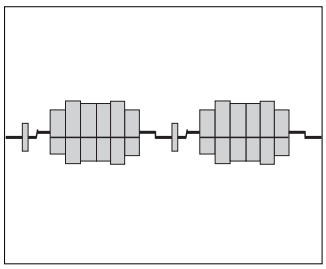
520 mVp-p (4.43 MHz) (PAL)

❺ IC201 ㊶ REC/PB



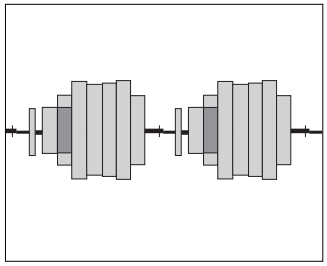
510 mVp-p (3.58 MHz) (NTSC)

❻ IC201 ㊿ REC/PB



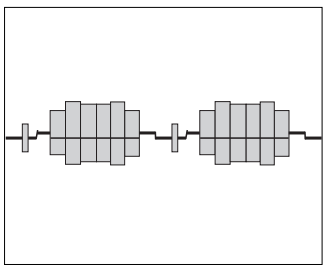
340 mVp-p (H) (PAL)

❼ IC201 ㊿ REC/PB



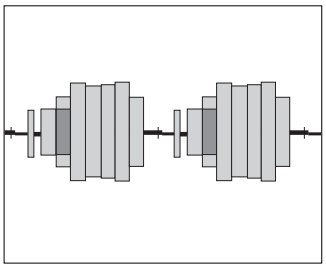
REC : 300 mVp-p (H) (NTSC)
PB : 290 mVp-p (H) (NTSC)

❽ IC201 ㊽ REC/PB



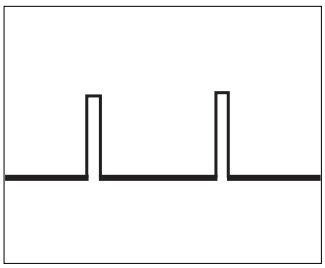
500 mVp-p (H) (PAL)

❾ IC201 ㊽ REC/PB



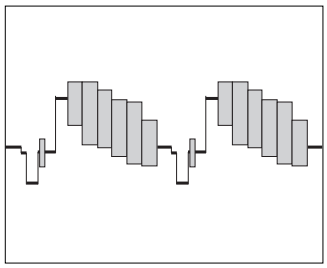
440 mVp-p (H) (NTSC)

❿ IC201 ㊿ REC/PB



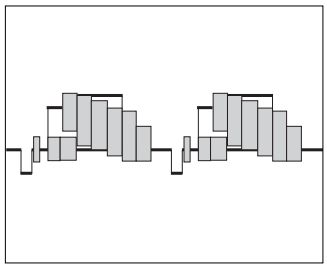
5.0 Vp-p (H)

⓫ IC201 ㉛ REC/PB



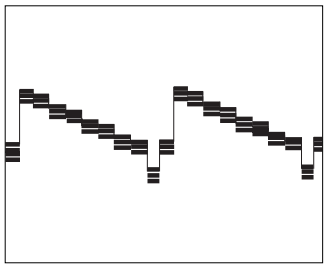
1.1 Vp-p (H) (PAL)

⓬ IC201 ㉛ REC/PB



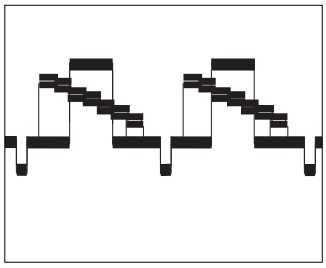
1.1 Vp-p (H) (NTSC)

⓭ IC201 ㉖ REC/PB



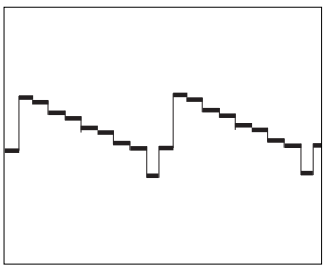
REC : 500 mVp-p (H) (PAL)
PB : 600 mVp-p (H) (PAL)

⓮ IC201 ㉖ REC/PB



REC : 620 mVp-p (H) (NTSC)
PB : 690 mVp-p (H) (NTSC)

⓯ IC201 ㉓ REC/PB

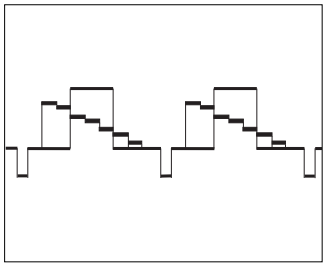


REC : 390 mVp-p (H) (PAL)
PB : 500 mVp-p (H) (PAL)

– Continued on next page –

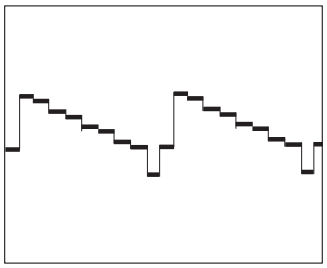
• Waveforms
– MA-366 (1/4) –

⓰ IC201 ㉓ REC/PB



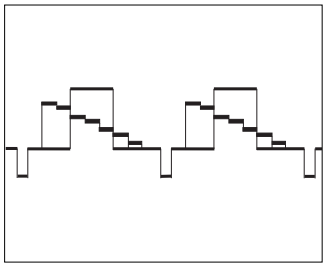
REC : 480 mVp-p (H) (NTSC)
PB : 550 mVp-p (H) (NTSC)

⓱ IC201 ㉑ REC/PB



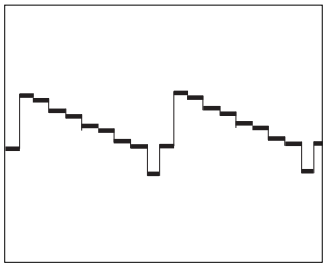
REC : 320 mVp-p (H) (PAL)
PB : 430 mVp-p (H) (PAL)

⓲ IC201 ㉑ REC/PB



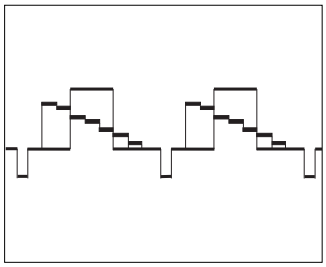
REC : 400 mVp-p (H) (NTSC)
PB : 450 mVp-p (H) (NTSC)

⓳ IC201 ⑱, ⑲ REC/PB



REC : 400 mVp-p (H) (PAL)
PB : 580 mVp-p (H) (PAL)

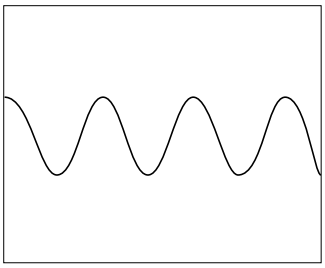
⓴ IC201 ⑱, ⑲ REC/PB



REC : 510 mVp-p (H) (NTSC)
PB : 560 mVp-p (H) (NTSC)

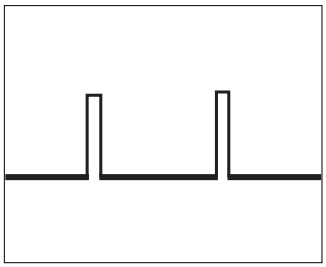
• Waveforms
– MA-366 (2/4) –

❶ IC101 ⑫ REC/PB



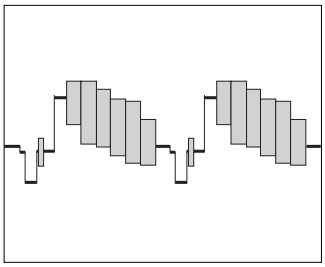
3.2 Vp-p (10 MHz)

❷ IC101 ㊹ REC/PB



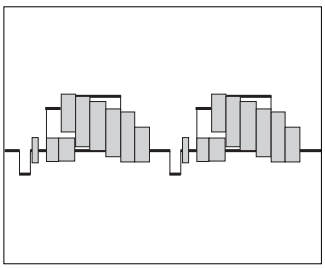
4.6 Vp-p (H)

❸ IC101 ㊸, ㊺ REC/PB



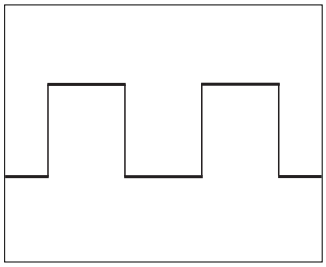
2.2 Vp-p (H) (PAL)

❹ IC101 ㊸, ㊺ REC/PB



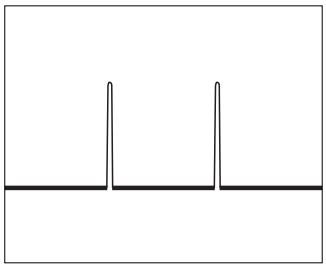
2.2 Vp-p (H) (NTSC)

❺ IC101 ㊵ REC/PB



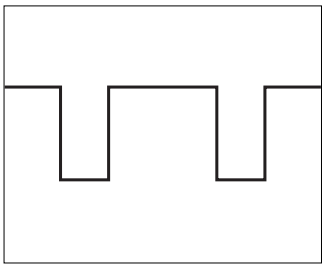
4.8 Vp-p (760 Hz) (PAL)
4.8 Vp-p (1 kHz) (NTSC)

❻ IC101 ㊴ REC/PB



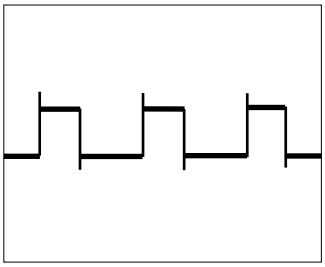
4.3 Vp-p (25 Hz) (PAL)
4.3 Vp-p (30 Hz) (NTSC)

❼ IC101 ㊳ REC/PB



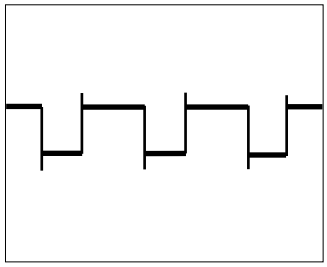
4.2 Vp-p (600 Hz) (PAL)
4.2 Vp-p (720 Hz) (NTSC)

❽ IC101 ㉜ REC



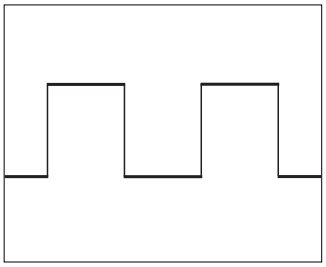
5.2 Vp-p (25 Hz) (PAL)
5.2 Vp-p (30 Hz) (NTSC)

❾ IC101 ㉛ REC



5.2 Vp-p (25 Hz) (PAL)
5.2 Vp-p (30 Hz) (NTSC)

❿ IC101 ㉓, ㉔ REC/PB

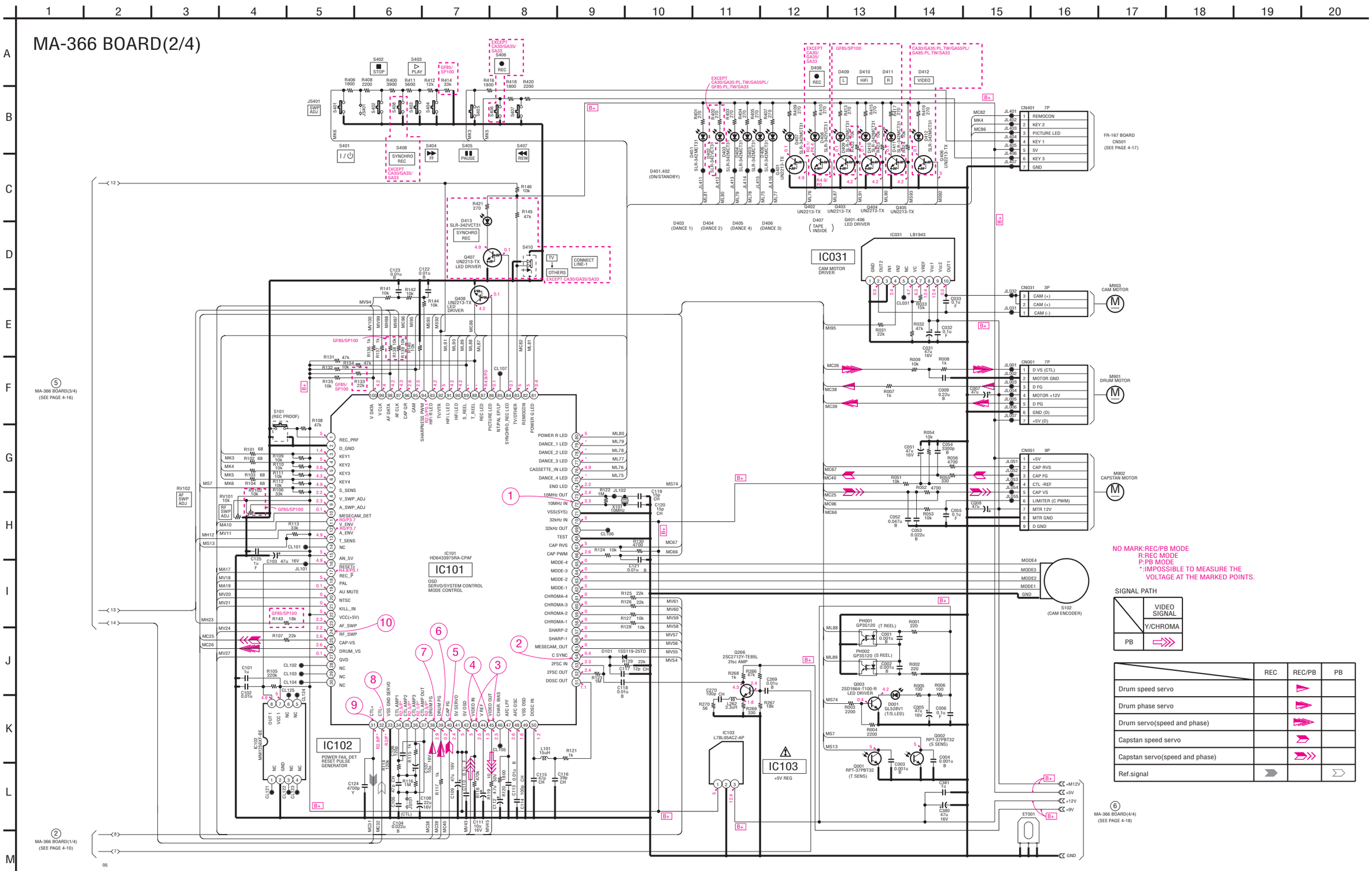


5 Vp-p (25 Hz) (PAL)
5 Vp-p (30 Hz) (NTSC)

MA-366 (OSD, SERVO/SYSTEM/MODE CONTROL) SCHEMATIC DIAGRAM • See page 4-5 for printed wiring board.

– Ref. No.: MA-366 board; 1,000 series –

MA-366 BOARD(2/4)



NO MARK:REC/PB MODE
R:REC MODE
P:PB MODE
*:IMPOSSIBLE TO MEASURE THE VOLTAGE AT THE MARKED POINTS.

SIGNAL PATH

	VIDEO SIGNAL
PB	Y/CHROMA

	REC	REC/PB	PB
Drum speed servo		▶	
Drum phase servo		▶	
Drum servo(speed and phase)		▶	
Capstan speed servo		▶	
Capstan servo(speed and phase)		▶	
Ref.signal	▶		▷

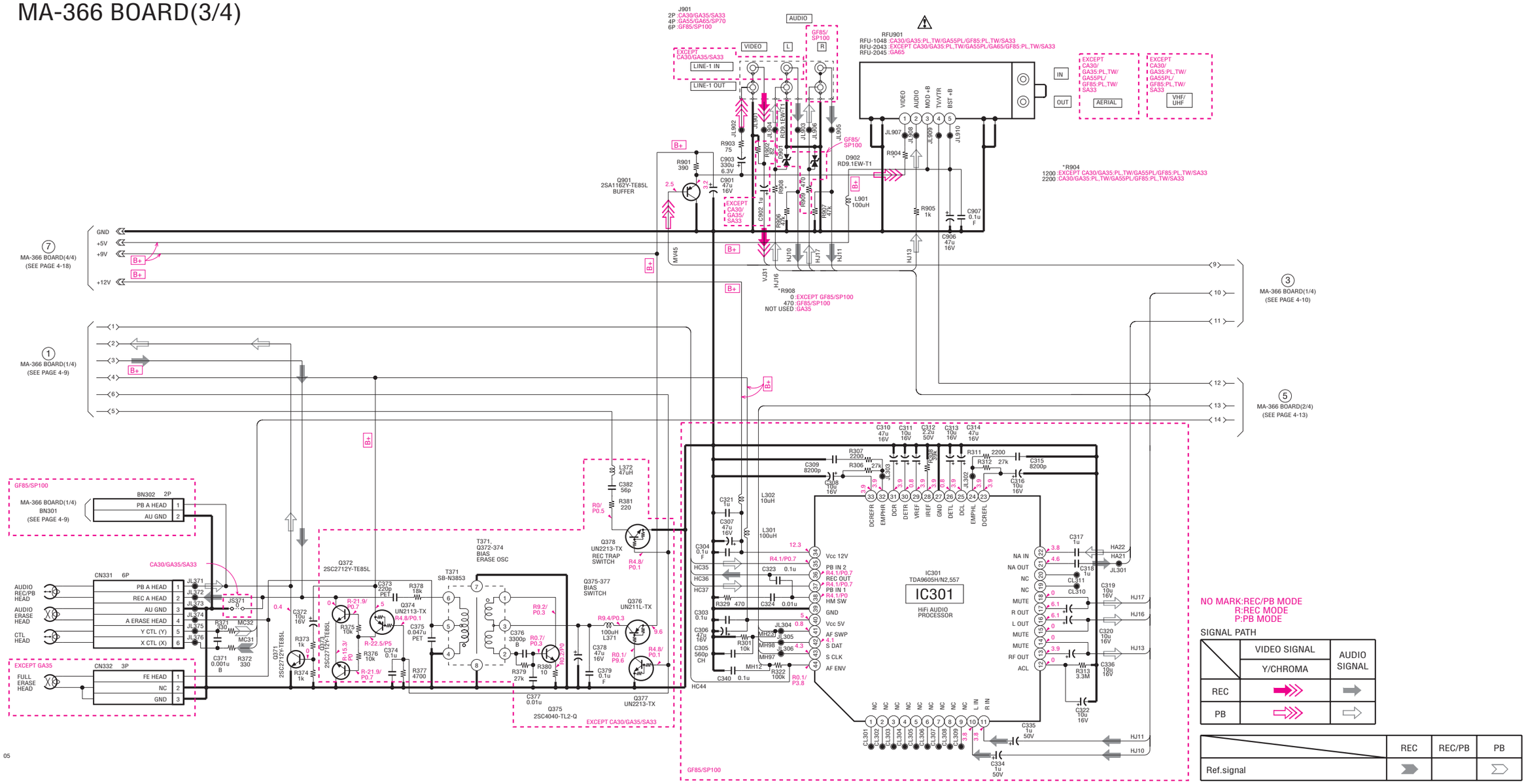
Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

OSD, SERVO/SYSTEM/MODE CONTROL
MA-366 (2/4)

MA-366 (HiFi AUDIO, I/O, TUNER) SCHEMATIC DIAGRAM • See page 4-5 for printed wiring board.

– Ref. No.: MA-366 board; 1,000 series –

MA-366 BOARD(3/4)



NO MARK:REC/PB MODE
R:REC MODE
P:PB MODE

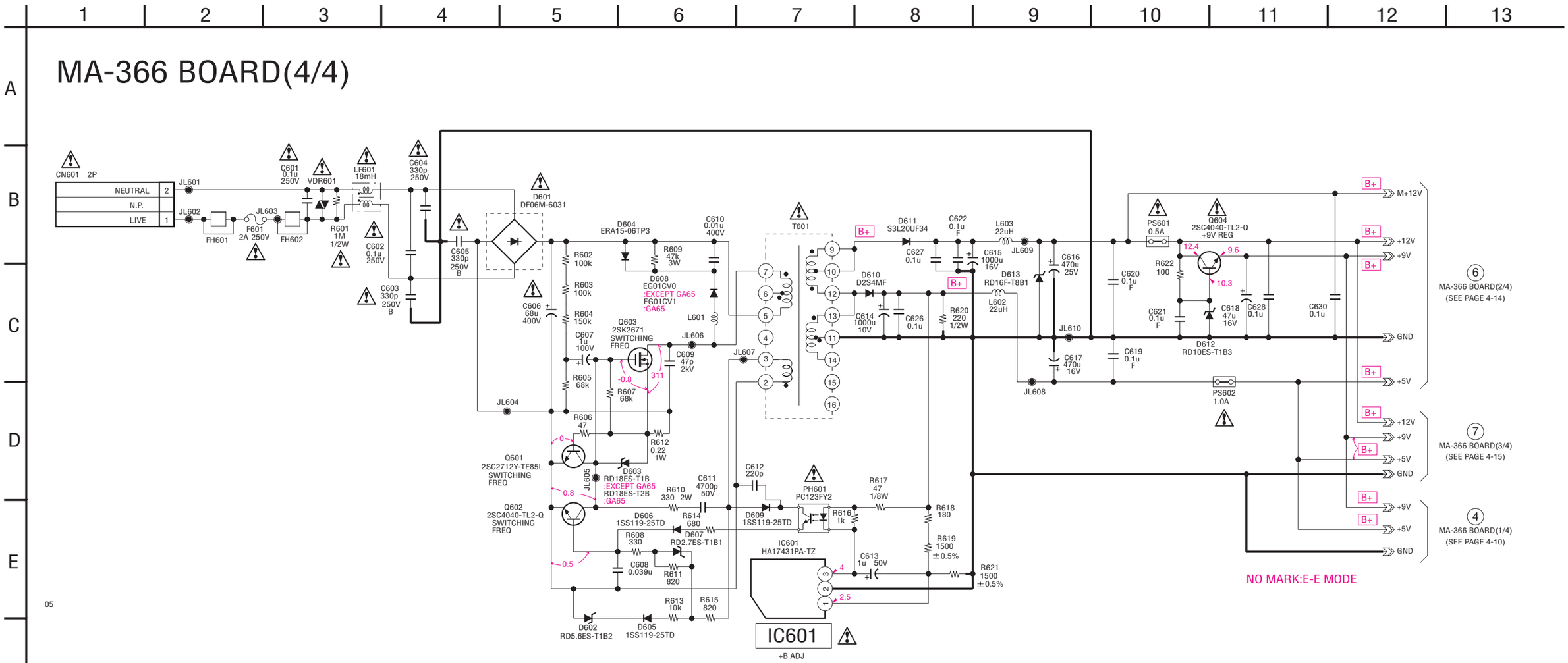
SIGNAL PATH

	VIDEO SIGNAL	AUDIO SIGNAL
	Y/CHROMA	
REC	➡	➡
PB	⇨	⇨

	REC	REC/PB	PB
Ref.signal	➡		⇨

MA-366 (POWER SUPPLY) SCHEMATIC DIAGRAM • **See page 4-5 for printed wiring board.**
– Ref. No.: MA-366 board; 1,000 series –

MA-366 BOARD(4/4)

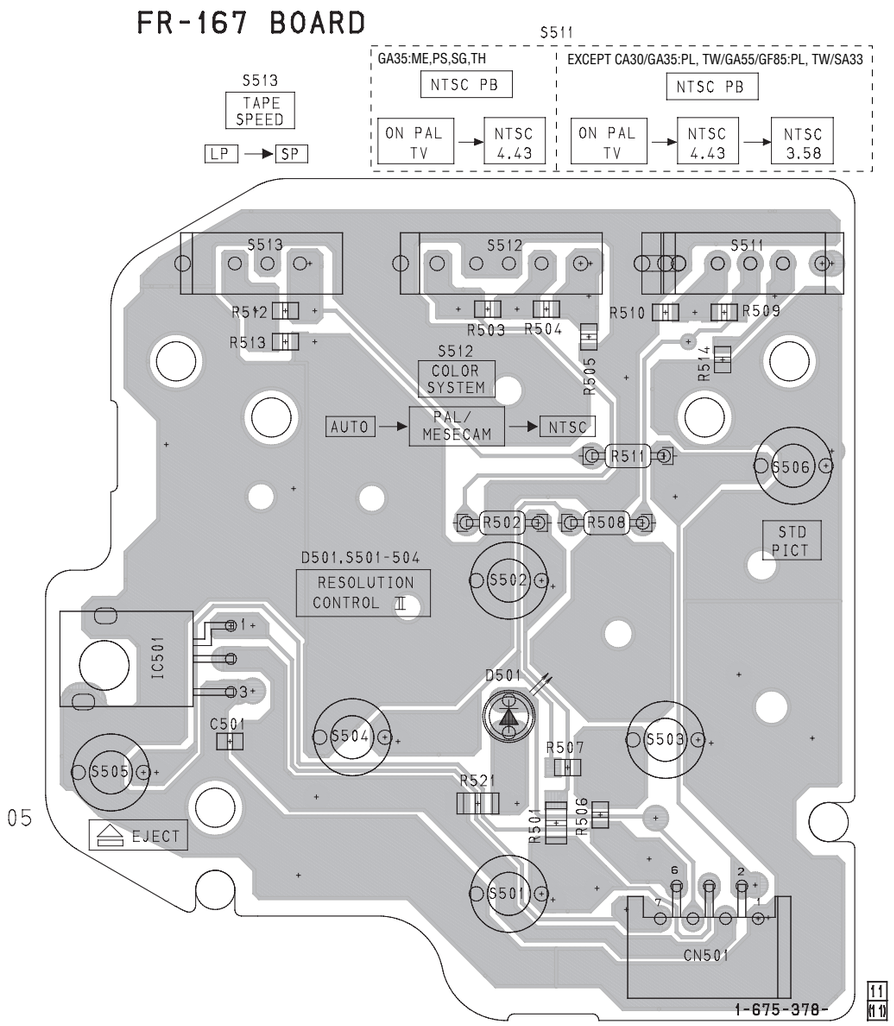


Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

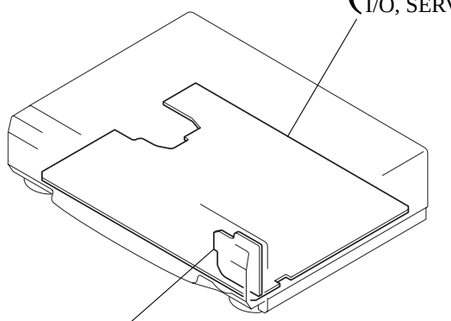
FR-167 (MODE CONTROL) PRINTED WIRING BOARD AND SCHEMATIC DIAGRAM

– Ref. No.: FR-167 board; 1,000 series –

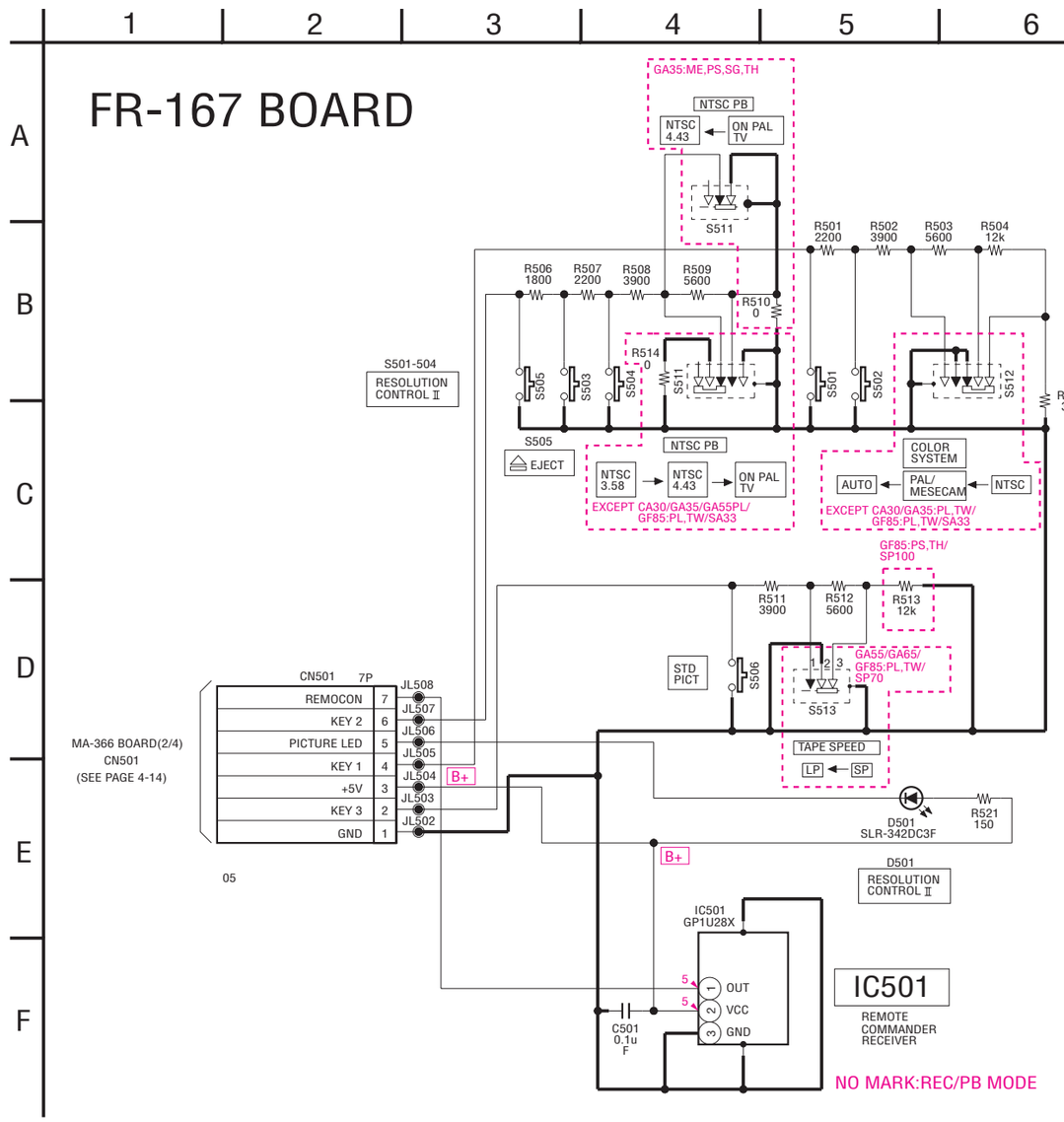
There are few cases that the part isn't mounted in this model is printed on this diagram.



MA-366
(VIDEO, AUDIO,
I/O, SERVO/SYSTEM CONTROL)



FR-167
(MODE CONTROL)



5-1. SYSTEM CONTROL – VIDEO BLOCK INTERFACE (MA-366 BOARD IC101)

Signal	Pin No.	I/O	STOP/ FF/ REW	TAPE THREAD-ING	TAPE UNTHREAD-ING	PB	PB • PAUSE	SLOW	× 2	CUE	REVIEW	REC	REC • PAUSE
RF SWP (SW30)	MA-366 IC101㉔	O	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1
QVD	MA-366 IC101㉗	O	L	L	L	*2	*3	*3	*2	*3	*3	L	L
C SYNC	MA-366 IC101㊹	I	*4	*5	*5	*5	*5	*5	*5	*5	*5	*5	*5
NT JUDGE	MA-366 IC101⑳	O	L	L	L	L	L	L	L	L	L	L	L

∗1. 25 Hz (PAL), 30 Hz (NTSC) pulse with 50% duty cycle. Synchronized with rotation of drum.
∗2. Normal PB "L". V period "H" pulse when ×1.
∗3. V period "H" pulse.
∗4. Selected by REC mode.
∗5. Composite Sync signal (positive polarity).

5-2. SYSTEM CONTROL – SERVO PERIPHERAL CIRCUIT INTERFACE (MA-366 BOARD IC101)

Signal	Pin No.	I/O	STOP	FF	REW	TAPE THREAD-ING	TAPE UNTHREAD-ING	PB	PB • PAUSE	SLOW	× 2	CUE	REVIEW	REC	REC • PAUSE
CAP QR	MA-366 IC101㊹	O	Hi-Z	Hi-Z	Hi-Z	Hi-Z	Hi-Z	Hi-Z	Hi-Z	*2	Hi-Z	Hi-Z	Hi-Z	Hi-Z	Hi-Z
DRM PG	MA-366 IC101㊴	I	*3	*1	*1	*4	*4	*1	*1	*1	*1	*1	*1	*1	*1
DRM FG	MA-366 IC101㊳	I	*3	*6	*6	*4	*4	*6	*6	*6	*6	*6	*6	*6	*6
CAP FG	MA-366 IC101㊵	I	H/L	*5	*5	*4	*4	*5	H/L	*5	*5	*5	*5	*5	H/L
CAP VS	MA-366 IC101㉕	O	*7	*7	*7	*7	*7	*8	*7	*7	*8	*8	*8	*8	*7
DRM VS	MA-366 IC101㉖	O	*9	*9	*9	*9	*9	*9	*9	*9	*9	*9	*9	*9	*9

∗1. 25 Hz (PAL), 30 Hz (NTSC) pulse.
∗2. Pulse at tape running.
∗3. "L" when drum rotation stop.
∗4. Unstable period pulse.
∗5. Pulse of period in proportion to tape speed.
∗6. 300 Hz (PAL), 360 Hz (NTSC) pulse.
∗7. Pulse at tape running.
∗8. Approx. 2 msec period "H" or "L" pulse.
∗9. Approx. 1.5 msec period "H" or "L" pulse.

5-3. SYSTEM CONTROL – MECHANISM BLOCK INTERFACE (MA-366 BOARD IC101)

Signal	Pin No.	I/O	EJECTED	CASSETTE LOADING	CASSETTE UNLOADING	TAPE THREAD-ING	TAPE UNTHREAD-ING	STOP	FF	REW	PB	PB • PAUSE	SLOW	× 2	CUE	REVIEW	REC	REC • PAUSE
CAM	MA-366 IC101㉟	Hi-Z	L	H	L	H	L	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7
MODE 1 (*8)	MA-366 IC101㉜	I	H	L	L	*1	*1	H	H	H	H	H	H	H	H	L	H	H
MODE 2 (*8)	MA-366 IC101㉝	I	H	L	L	*1	*1	H	H	H	L	L	L	L	L	L	L	L
MODE 3 (*8)	MA-366 IC101㉞	I	L	L	L	*1	*1	H	L	L	L	L	L	L	L	H	L	L
MODE 4 (*8)	MA-366 IC101㉟	I	L	H	H	*1	*1	L	H	H	H	L	L	L	L	L	L	L
REC PRF	MA-366 IC101①	I	H	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2
T REEL FG	MA-366 IC101㊽	I	H/L	H/L	H/L	H/L	H/L	H/L	*3	*3	*3	H/L	*3	*3	*3	*3	*3	H/L
S REEL FG	MA-366 IC101㊾	I	H/L	H/L	H/L	*3	*3	H/L	*3	*3	*3	H/L	*3	*3	*3	*3	*3	H/L
END LED	MA-366 IC101㉔	O (O.D)	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4
CAP RVS	MA-366 IC101㉗	O	H			L	H	H/L	L	H	L	L	L/*5	L	L	H	L	L
T SENS	MA-366 IC101⑬	I	*4	*4	*4	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6
S SENS	MA-366 IC101⑦	I	*4	*4	*4	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6

∗1. Uncertainty.
∗2. “L” when erasing protection tab is bent, “H” when not bent.
∗3. Pulse of period in proportion to reel rotating speed.
∗4. Approx. 2 msec period “H” pulse.
∗5. Pulse at tape running.
∗6. Normally “L”. 2 msec period “H” pulse when tape top or tape end is detected.
∗7. When transition to UNLOADING direction: L.
When transition to LOADING direction: H.
When CAM motor is stopped: Hi-Z.
∗8. When RVS slow: Mode 1=“L”
When RVS slow: Mode 2=“L”
When RVS slow: Mode 3=“H”
When RVS slow: Mode 4=“L”

5-4. SYSTEM CONTROL – AUDIO BLOCK INTERFACE (MA-366 BOARD IC101)

Signal	Pin No.	I/O	STOP/ FF/ REW	TAPE LOADING	TAPE UNLOADING	PB	PB • PAUSE	SLOW	× 2	CUE	REVIEW	REC	REC • PAUSE
AF ENV	MA-366 IC101⑫	I	AF RF envelope signal input terminal for automatic tracking.										
A MUTE	MA-366 IIC101⑲	O (O.D)	Hi-Z	Hi-Z	Hi-Z	Hi-Z	H	H	H	H	H	L	L
AF REC $\bar{P}$	MA-366 IC101⑰	O	L	L	L	L	L	L	L	L	L	H	L
AF SWP	MA-366 IC101㉓	O	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1

*1. 30 Hz 50% duty pulse approx. 5 msec delayed from RF SW P.

5-5. SERVO/SYSTEM CONTROL MICROPROCESSOR PIN FUNCTION (MA-366 BOARD IC101)

Pin No.	Pin Name	I/O	Function
1	REC PRF	I	Erasing protection tab. cassette in detection
2	D GND	–	Digital circuit ground
3	KEY 1	I	Function key analog voltage input 1
4	KEY 2	I	Function key analog voltage input 2
5	KEY 3	I	Function key analog voltage input 3
6	KEY 4	I	Function key analog voltage input 4
7	S SENS	I	Supply end sensor signal input
8	V SWP ADJ	I	Video switching position adjustment
9	A SWP ADJ	I	Audio switching position adjustment
10	MESECAM DET	I	MESECAM detect signal input “H” : MESECAM
11	V ENV	I	Video playback signal envelope
12	A ENV	I	HiFi audio playback signal envelope
13	T SENS	I	Take-up end sensor signal input
14	NC	–	Not used
15	AN +5V	–	Analog circuit ground
16	$\overline{\text{RESET}}$	I	Reset signal input
17	REC $\overline{\text{P}}$	O	“L” : output when REC pause mode
18	PAL	O	“H” : PAL/MESECAM (video block control signal output)
19	AU MUTE	O	“H” : audio mute signal output
20	NTSC	O	“H” : NTSC (video block control signal output)
21	KILL IN	I	Color killer detect signal input
22	VCC (+5V)	–	Power supply
23	AF SWP	O	AF switching pulse output
24	RF SWP	O	RF switching pulse output
25	CAP VS	O	Capstan error signal output
26	DRUM VS	O	Drum motor error signal output
27	QVD	O	Quasi VD pulse output
28	NC	–	Not used
29	NC	–	Not used
30	NC	–	Not used
31	CTL+	I/O	CTL head signal input/output
32	CTL–	I/O	CTL head signal input/output
33	VSS GND SERVO	–	Servo circuit ground
34	CTL AMP 1	I	CTL Amp. control (Gain set)
35	CTL AMP 2	I	CTL Amp. control (Gain set)
36	CTL AMP 3	I	CTL Amp. control (Gain set)
37	CTL AMP OUT	O	CTL Amp. output (For check)
38	DRUM FG	I	Drum FG Schmidt amp. input
39	DRUM PG	I	Drum PG Schmidt amp. input
40	CAP FG	I	Capstan FG Schmidt input
41	+5V SERVO	–	Servo circuit power supply
42	+5V OSD	–	OSD circuit power supply
43	VIDEO IN	I	Video signal input
44	VREF	I	Reference bias and clamp bias power pin
45	VIDEO OUT	O	Video signal output
46	CHAR.BIAS	–	Not used
47	AFC LPF	I	AFC LPF pin input
48	AFC OSC	I	AFC oscillator pin input
49	VSS OSD	–	OSD circuit ground
50	DOSC IN	I	OSD dot clock oscillator (input)

Pin No.	Pin Name	I/O	Function
51	DOSC OUT	O	OSD dot clock oscillator (output)
52	2FSC OUT	O	OSD 2fsc oscillator terminal (output)
53	2FSC IN	I	OSD 2fsc oscillator terminal (input)
54	C SYNC	I	Composite Sync signal input
55	MESECAM OUT	O	“H” : MESECAM (video block control signal output)
56	SHARP 1	O	“H” : Active (SHARPNESS control)
57	SHARP 2	O	“H” : Active (SHARPNESS control)
58	CHROMA 1	O	“H” : Active (CHROMA control)
59	CHROMA 2	O	“H” : Active (CHROMA control)
60	CHROMA 3	O	“H” : Active (CHROMA control)
61	CHROMA 4	O	“H” : Active (CHROMA control)
62	MODE 1	I	Mechanism section CAM encoder input (data 1)
63	MODE 2	I	Mechanism section CAM encoder input (data 2)
64	MODE 3	I	Mechanism section CAM encoder input (data 3)
65	MODE 4	I	Mechanism section CAM encoder input (data 4)
66	CAP PWM	O	Capstan PWM output
67	CAP RVS	O	Capstan reverse control signal “L” : when reverse
68	TEST	I	Fixed to ground
69	32kHz OUT	–	Not used
70	32kHz IN	–	Not used (Fixed to +5V)
71	VSS (SYS)	–	Ground
72	10MHz IN	I	System clock terminal (10MHz)
73	10MHz OUT	O	System clock terminal (10MHz)
74	END LED	O	Top/End LED ON/OFF control
75	DANCE 4 LED	O	““L” : On, “H” : Off (LED)”
76	CASSETTE IN LED	O	““L” : On, “H” : Off (Cassette in LED)”
77	DANCE 3 LED	O	““L” : On, “H” : Off (LED)”
78	DANCE 2 LED	O	““L” : On, “H” : Off (LED)”
79	DANCE 1 LED	O	““L” : On, “H” : Off (LED)”
80	POWER R LED	O	““H” : Standby, “L” : Power on (ON/STANDBY LED)”
81	POWER G LED	O	““L” : Standby, “H” : Power on (ON/STANDBY LED)”
82	REMOCON	I	Remote control signal (SIRCS) input
83	TV/OTHER	I	“Connect LINE-1 select “H” : Other, “L” : TV”
84	SYNCHRO REC LED	O	““H” : On, “L” :Off (SYNC REC LED)”
85	NT/PAL EP/LP	O	Not used
86	PICTURE LED	O	“H” : Active (RESOLUTION CONTROL II LED)
87	REC LED	O	““H” : On, “L” :Off (REC LED)”
88	T REEL	I	Take-up reel FG input
89	S REEL	I	Supply reel FG input
90	HiFi LED	O	““H” : On, “L” :Off (HiFi LED)”
91	HiFi L LED	O	““H” : On, “L” :Off (Lch LED)”
92	TV/VTR	O	RF output TV/VTR select
93	HiFi R LED	O	““H” : On, “L” : Off (Rch LED)”
94	SHARPNESS PWM	O	Video IC sharpness voltage
95	CAM	O	“CAM motor control “H” : Forward, “M” : Brake “L” : Reverse”
96	CAP QR	O	Capstan step driving
97	AF CLK	O	I2C-bus clock (HiFi)
98	AF DATA	O	I2C-bus data (HiFi)
99	V CLK	O	I2C-bus clock (Video)
100	V DATA	O	I2C-bus data (Video)

SECTION 6
ADJUSTMENTS

During the adjustment, see the Parts Arrangement Diagram for Adjustments on Page 6-4.

6-1. MECHANICAL ADJUSTMENTS

Refer to the SERVICE MANUAL of VHS MECHANICAL ADJUSTMENT VI.

6-2. ELECTRICAL ADJUSTMENTS

2-1. PRE-ADJUSTMENT PREPARATIONS

Necessary items and indications for total adjustment of electric circuit of this machine will be described in this chapter.

2-1-1. Instruments to be Used

1) Color TV
2) Oscilloscope 1 or 2 phenomena, band more than 30 MHz, delay mode, as provided.
3) NTSC pattern generator
4) PAL pattern generator
5) Digital voltmeter
6) Audio level meter
7) Audio noise meter
8) Audio generator
9) Attenuator
10) Alignment tape
    Part Code: 8-192-605-36 KRV-51P (PAL)
    Part Code: 8-192-605-32 KRV-51N2 (NTSC)

2-1-2. Connection

Unless otherwise specified, connect and adjust the measuring instruments as shown in the following diagram.

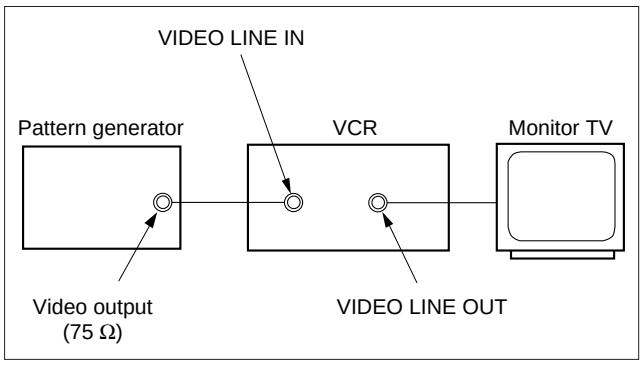


Fig. 6-2-1

2-1-3. Set-up of Adjustment

In this adjustment, PAL or NTSC pattern generator is connected with LINE input signal terminal. When check to tuner, connected AERIAL terminal. Check that the amplitudes of video signal SYNC signal, of picture portions, and of burst signals are flat at approximately 0.3, 0.7 and 0.3 V, respectively, and that the level ratio of the burst signal and "red" signal are 0.30: 0.66. Fig. 6-2-2. shows video signals (color bars) used in adjusting the video section.

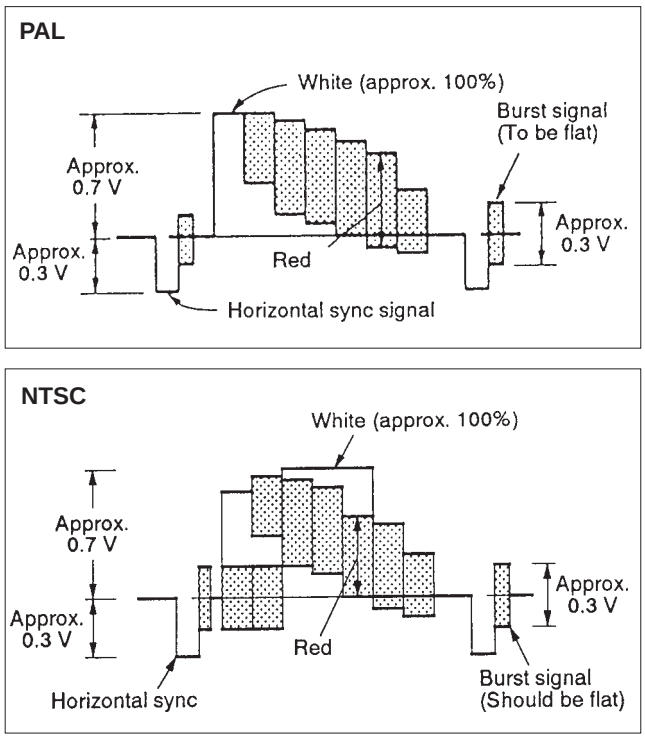


Fig. 6-2-2

2-1-4. Alignment Tapes [Alignment Tape (KRV-51N2 / KRV-51P)]

	Mode	Time	Video signal	Audio signal (HiFi/Normal)
1	SP	Seven minutes	Color bar	400 Hz
2	SP	Three minutes	Monoscope	
3	EP	Seven minutes	Color bar	
4	EP	Three minutes	Monoscope	

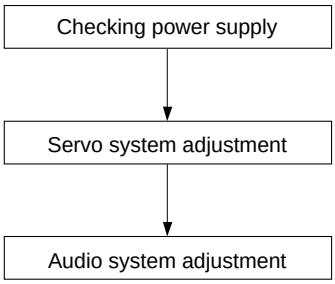
2-1-5. Specified I/O Level and Impedance

Input/output terminal

Video inputs	LINE IN : phono jack
	1 Vp-p, 75 Ω, unbalanced, sync negative
Audio inputs	LINE IN : phono jacks
	47 kW, –7.5 dBs (0 dBs = 0.775 Vrms)
	More than 10 kW, –4 dBs
Video outputs	LINE OUT: phono jack
	1 Vp-p, 75 Ω, unbalanced, sync negative
Audio outputs	LINE OUT: phono jacks
	–7.5 dBs at load impedance 47 kΩ
	Output impedance : less than 10 Ω

2-1-6. Adjusting Sequence

Make the electrical adjustment in the following sequence.



2-2. POWER SUPPLY ADJUSTMENTS

2-2-1. Power Supply Check (MA-366 Board)

Mode	E-E
Measuring Instrument	Digital voltmeter
+12 V check	
Measurement Point	Collector of Q604
Specified Value	12.0 ± 0.3 V
+5 V check	
Measurement Point	Pin ⑦ of CN001
Specified Value	5.0 ± 0.25 V
+9 V check	
Measurement Point	Emitter of Q604
Specified Value	9.0 ± 0.3 V
MTR12 V check	
Measurement Point	Pin ④ of CN001
Specified Value	12.0 ± 0.3 V

Checking Method:

1) Confirm that each voltage meets its specified value.

2-3. SERVO SYSTEM ADJUSTMENTS

2-3-1. RF Switching Position Adjustment (MA-366 Board)

Purpose:

Adjust the interval between A ch and B ch of tape playback output.

Improve the interchangeability with other tapes and sets.

When it is out of order, the interval appears on the screen, the screen is disturbed.

Mode	PB
Signal	Alignment tape SP mode color bar
Measurement Point	CH1: VIDEO LINE OUT CH2: Pin ③ of CN202 (V SWP)
Measuring Instrument	Oscilloscope
Adjusting Element	RV101
Specified Value	6.5 ± 1.0 H (416 ± 60 µsec) PAL 6.5 ± 1.0 H (413 ± 60 µsec) NTSC

Adjusting Method:

1) Connect MA-366 board JS401 to the GND for about 1 second to activate the RF switching position adjustment mode.
2) Check that D403 and D405 mutually flash on and off quickly.
3) Check that switching position is 6.5 ± 1.0 H.
4) If not meet the specified value, turn RV101 and repeat steps 3 to 4.

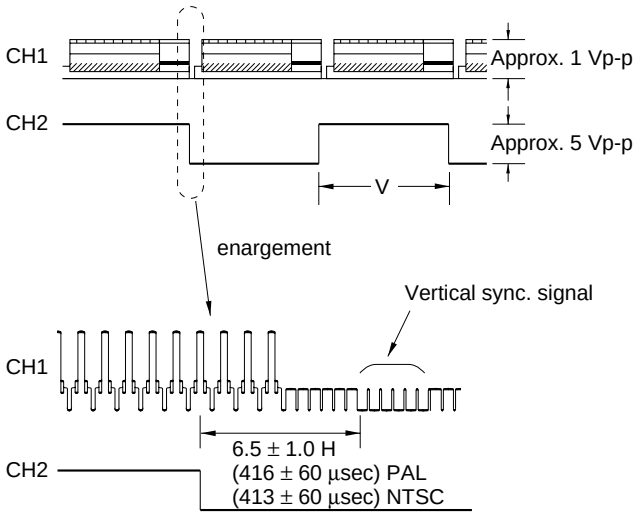


Fig. 6-2-3.

2-4. AUDIO SYSTEM ADJUSTMENTS

• Adjust both Lch and Rch.

[Connection]

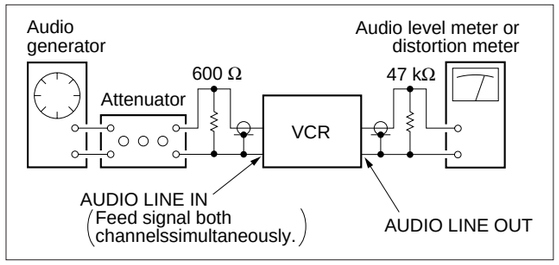


Fig. 6-2-4.

2-4-1. Hi-Fi Audio System Adjustment (SLV-GF85/SP100)

• Set switches and knobs to the following positions to make adjustment unless otherwise specified.
AUDIO MONITOR ..... STEREO

1. AF Switching Position Adjustment (MA-366 Board)

Purpose:

Adjust the interval between A ch and B ch of tape playback output. Improve the interchangeability with other tapes and sets. When it is out of order, noisy sound is increased and big noise is heard.

Mode	PB
Signal bar	Alignment tape SP mode color
Measurement point	CH1: Pin ③ of CN202 CH2: Pin ① of CN202
Measuring Instrument	Oscilloscope
Adjusting Element	RV102
Specified Value	Fig. 6-2-5

Adjusting Method:

1) Connect MA-366 board JS401 to the GND for about 1 second to activate the RF switching position adjustment mode.
2) Check that D403 and D405 mutually flash on and off quickly.
3) Adjust RV102 to minimize a chipped portion.
At the time, confirm that a noisy sound is not heard.

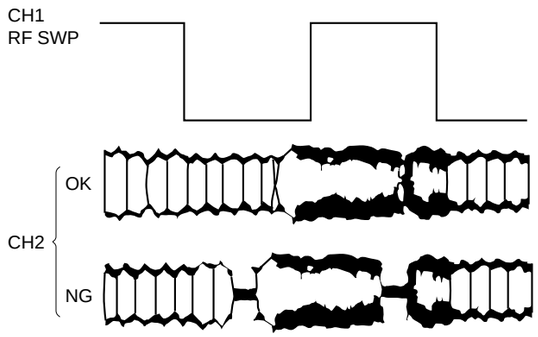


Fig. 6-2-5.

2-4-2. Normal Audio System Adjustment

• Make adjustment in the SP mode, unless otherwise specified. Use a normal VHS cassette for an adjustment tape.
• Set AUDIO MONITOR to normal.

[Adjustment Sequence]

1. ACE Head Adjustment
2. E-E Output Level Check

1. ACE Head Adjustment

Refer to the service manual of VHS MECHANICAL ADJUSTMENT VI.

2. E-E Output Level Check

Purpose:

Confirm that the output level against the reference input is within the specification.

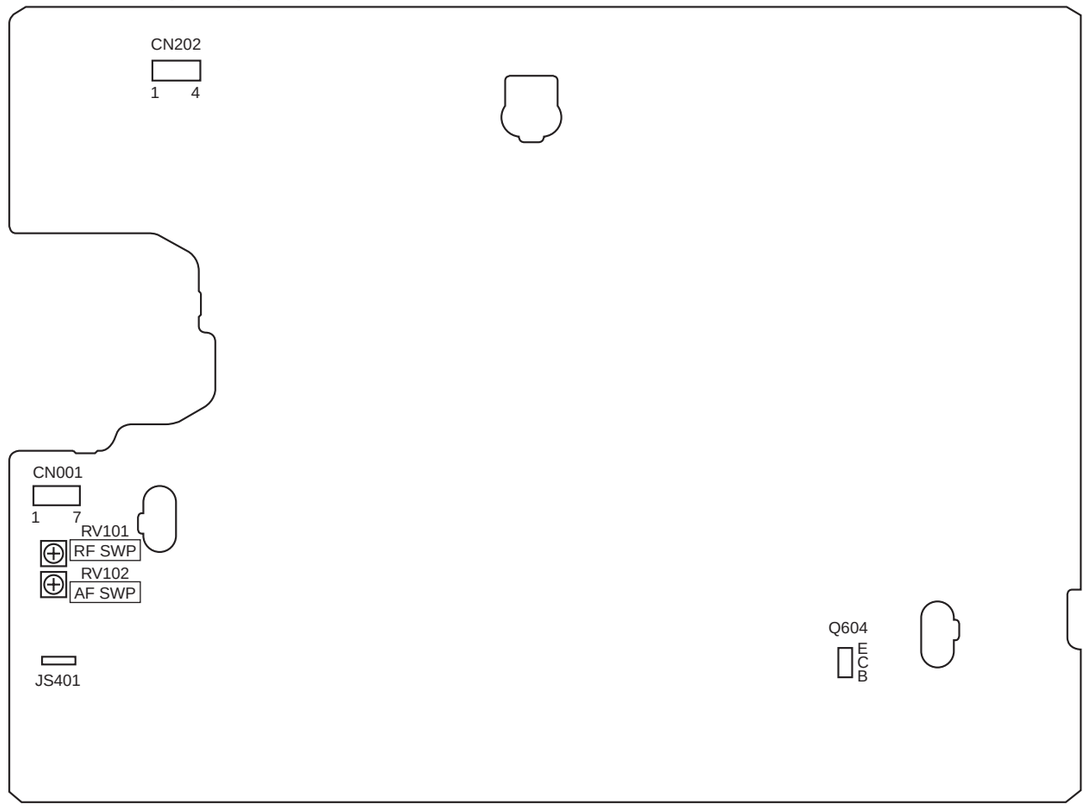
Mode	E-E
Signal	L, R: 400 Hz, –7.5 dBs
Measurement point	Audio output terminal
Measurement equipment	Audio level meter
Specified value	–7.5 ± 2 dBs

Confirmation Method:

1) Simultaneously input a signal of 400 Hz, –7.5 dBs to both L and R channels of Audio Line Input.
2) Confirm that the audio output level is –7.5 ± 2 dBs.

2-5. PARTS ARRANGEMENT DIAGRAM FOR ADJUSTMENTS

MA-366 BOARD (side A)



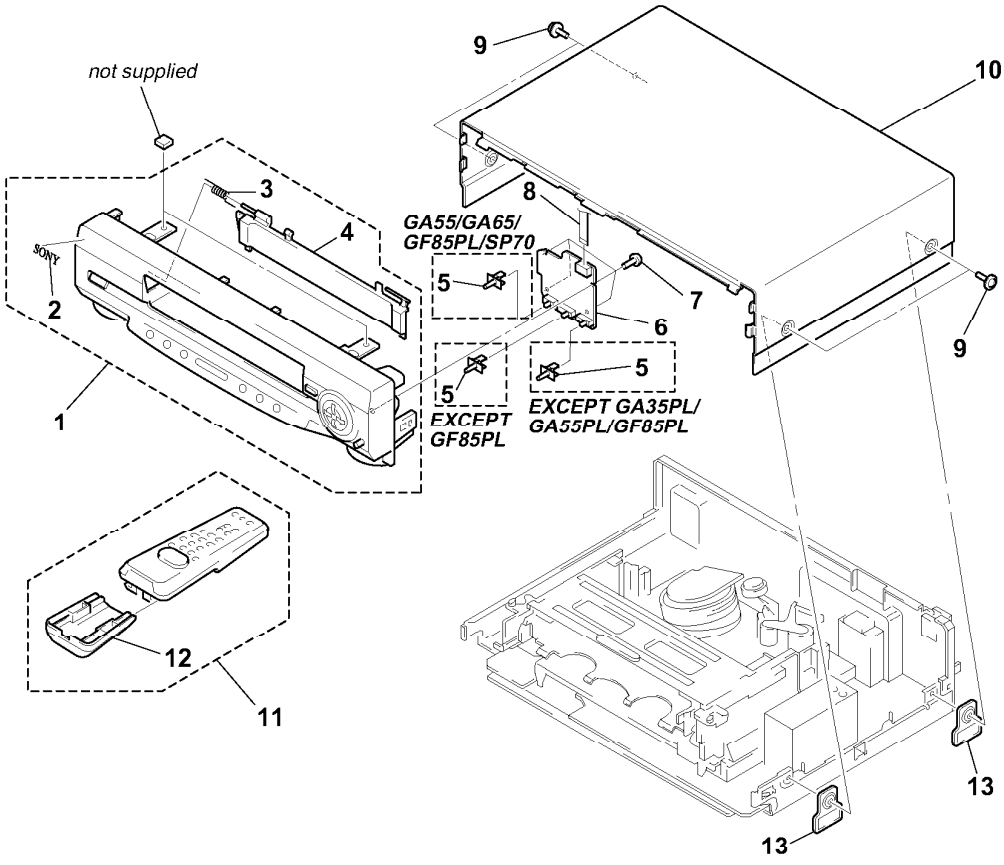
SECTION 7
REPAIR PARTS LIST

7-1. EXPLODED VIEWS

NOTE:
- -XX and -X mean standardized parts, so they may have some difference from the original one.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.
- Hardware (# mark) list and accessories and packing materials are given in the last of the electrical parts list.

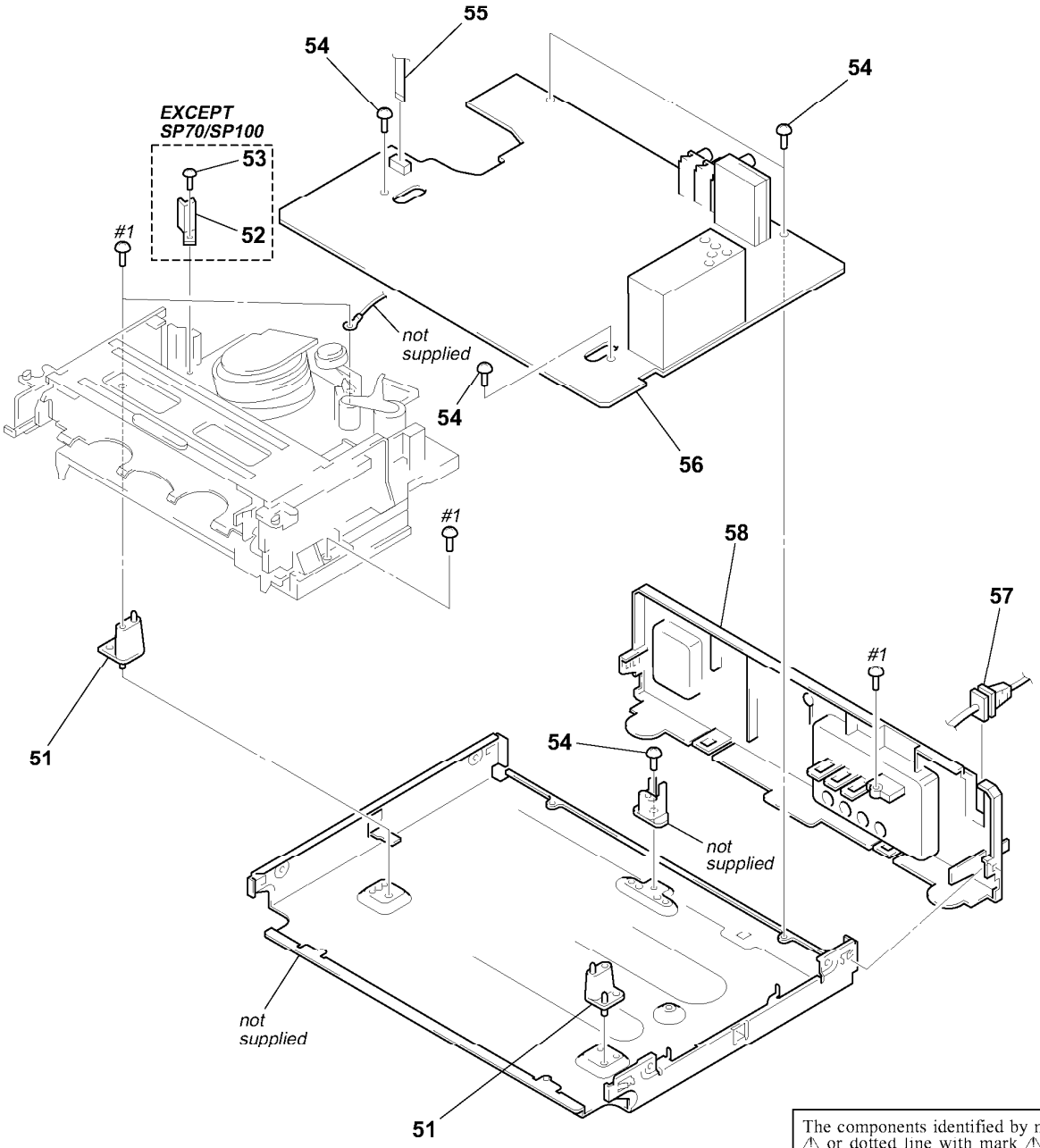
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

7-1-1. FRONT PANEL AND CABINET ASSEMBLIES



Ref. No.	Part No.	Description	Remark
1	X-3950-003-2	PANEL ASSY, FRONT (GF85: PS, TH)	
1	X-3950-004-2	PANEL ASSY, FRONT (GA35: PS, TH)	
1	X-3950-005-2	PANEL ASSY, FRONT (GA35: ME, SG)	
1	X-3950-006-2	PANEL ASSY, FRONT (GA55: PS, TH)	
1	X-3950-007-2	PANEL ASSY, FRONT (GA55: ME, SG)	
1	X-3950-008-2	PANEL ASSY, FRONT (GA65)	
1	X-3950-009-2	PANEL ASSY, FRONT (SP70)	
1	X-3950-010-2	PANEL ASSY, FRONT (SP100)	
1	X-3950-011-2	PANEL ASSY, FRONT (GA55PL)	
1	X-3950-012-2	PANEL ASSY, FRONT (GA35PL)	
1	X-3950-013-2	PANEL ASSY, FRONT (GF85PL)	
1	X-3950-014-1	PANEL ASSY, FRONT (GF85TW)	
1	X-3950-015-1	PANEL ASSY, FRONT (CA30)	
1	X-3950-085-1	PANEL ASSY, FRONT (SA33)	
1	X-3950-086-1	PANEL ASSY, FRONT (GA35TW)	
2	3-943-995-01	EMBLEM (NO.5), SONY (GA35: ME, SG/GA55: ME, SG/SP70)	
2	3-943-995-31	EMBLEM (NO.5), SONY (EXCEPT GA35: ME, SG/GA55: ME, SG/SP70)	
3	3-953-432-01	SPRING (GE), FL	
4	3-059-648-01	DOOR, CASSETTE (GF85)	
4	3-059-648-11	DOOR, CASSETTE (CA30/GA35: PL, PS, SG, TH, TW/SA33)	
4	3-059-648-21	DOOR, CASSETTE (GA35: ME, SG)	
4	3-059-648-31	DOOR, CASSETTE (GA55: PL, PS, TH/GA65)	
4	3-059-648-41	DOOR, CASSETTE (GA55: ME, SG)	
4	3-059-648-51	DOOR, CASSETTE (SP70)	
4	3-059-648-61	DOOR, CASSETTE (SP100)	
5	3-051-662-01	KNOB, SLIDE (EXCEPT GA35: ME, SG/GA55: ME, SG/SP70)	
5	3-051-662-41	KNOB, SLIDE (GA35: ME, SG/GA55: ME, SG/SP70)	
* 6	A-6794-720-A	FR-167 BOARD, COMPLETE (GF85PL)	
* 6	A-6794-721-A	FR-167 BOARD, COMPLETE (GA55: ME, PS, SG, TH/SP70)	
* 6	A-6794-722-A	FR-167 BOARD, COMPLETE (GA35: ME, PS, SG, TH)	
* 6	A-6794-723-A	FR-167 BOARD, COMPLETE (GF85: PS, TH/SP100)	
* 6	A-6794-727-A	FR-167 BOARD, COMPLETE (GA55PL)	
* 6	A-6794-728-A	FR-167 BOARD, COMPLETE (GA65)	
* 6	A-6794-729-A	FR-167 BOARD, COMPLETE (GA35PL)	
* 6	A-6764-731-A	FR-167 BOARD, COMPLETE (CA30/GA35TW/SA33)	
* 6	A-6764-732-A	FR-167 BOARD, COMPLETE (GF85TW)	
7	4-921-277-41	SCREW (B2.6X8), TAPPING, BIND	
8	1-791-514-11	CABLE, FLAT (FFM-32)	
9	3-058-554-01	SCREW, U/C (EXCEPT GA35: ME, SG/GA55: ME, SG/SP70)	
9	3-058-554-11	SCREW, U/C (GA35: ME, SG/GA55: ME, SG/SP70)	
10	3-053-078-81	CASE, UPPER (EXCEPT GA35: ME, SG/GA55: ME, SG/SP70)	
10	3-053-078-91	CASE, UPPER (GA35: ME, SG/GA55: ME, SG/SP70)	
11	1-418-631-11	COMMANDER, STANDARD (RMT-V286) (EXCEPT CA30/GA35/GF85TW/SA33)	
11	1-418-631-21	COMMANDER, STANDARD (RMT-V286A) (GA35: ME, PL, PS, SG,TH)	
11	1-418-779-11	COMMANDER, STANDARD (RMT-V286B) (GF85TW)	
11	1-418-779-21	COMMANDER, STANDARD (RMT-V286C) (CA30/GA35TW/SA33)	
12	3-709-269-01	COVER, BATTERY (for RMT-V286/V286A/V286B/V286C)	
13	3-058-199-01	INSULATOR, U/C	

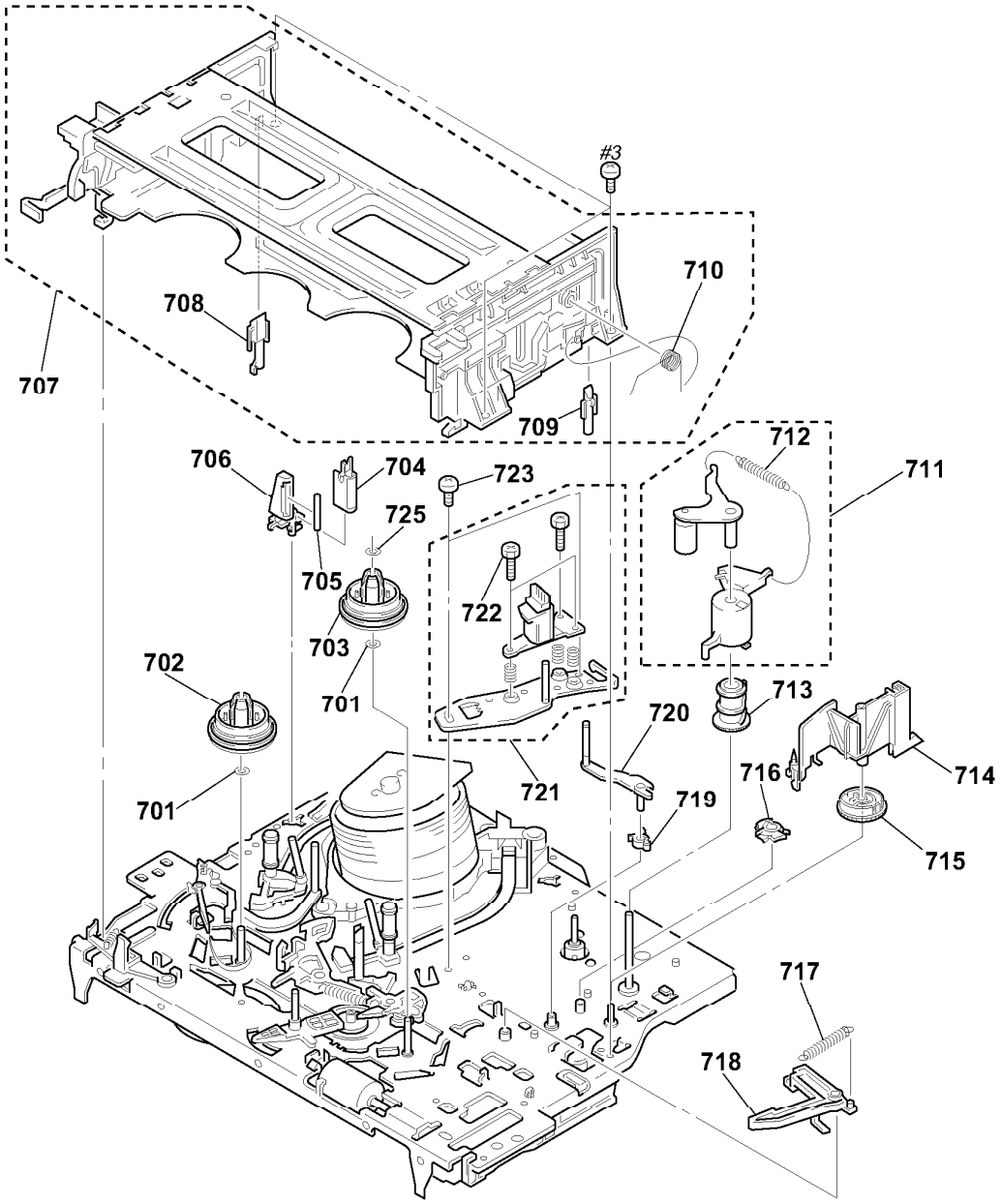
7-1-2. CHASSIS ASSEMBLY



The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref. No.	Part No.	Description	Remark
* 51	3-959-383-01	BASE (R), MD	
52	X-3947-568-1	TC (N17S) ASSY (EXCEPT SP70/SP100)	
53	3-979-112-01	SCREW SW (+) BVTP 3X10	(EXCEPT SP70/SP100)
54	3-970-608-21	SUMITITE (B3), +BV	
55	1-791-515-11	CABLE, FLAT (FDM-8)	
* 56	A-6713-545-A	MA-366 BOARD, COMPLETE (GF85PL)	
* 56	A-6713-546-A	MA-366 BOARD, COMPLETE	(GA55: ME, PS, SG, TH/SP70)
* 56	A-6713-547-A	MA-366 BOARD, COMPLETE	(GA35: ME, PS, SG, TH)
* 56	A-6713-548-A	MA-366 BOARD, COMPLETE	(GF85: PS, TH/SP100)
* 56	A-6713-552-A	MA-366 BOARD, COMPLETE (GA65)	
* 56	A-6713-553-A	MA-366 BOARD, COMPLETE (GA35PL)	
* 56	A-6713-554-A	MA-366 BOARD, COMPLETE	(CA30/GA35TW/SA33)
* 56	A-6713-555-A	MA-366 BOARD, COMPLETE (GF85TW)	
⚠57	1-777-850-51	CORD, POWER (EXCEPT CA30/GA35: PL, TW/GA55PL/GF85: PL, TW/SA33)	
⚠57	1-777-956-11	CORD, POWER (CA30/GA35: PL, TW/GA55PL/GF85: PL, TW/SA33)	
58	3-052-070-01	PANEL (M) REAR	(GA55/GA65/GF85: PS, TH/SP70/SP100)
58	3-052-070-21	PANEL (M) REAR (GA35: ME, PS, SG, TH)	
58	3-052-070-31	PANEL (M) REAR (GF85: PL, TW)	

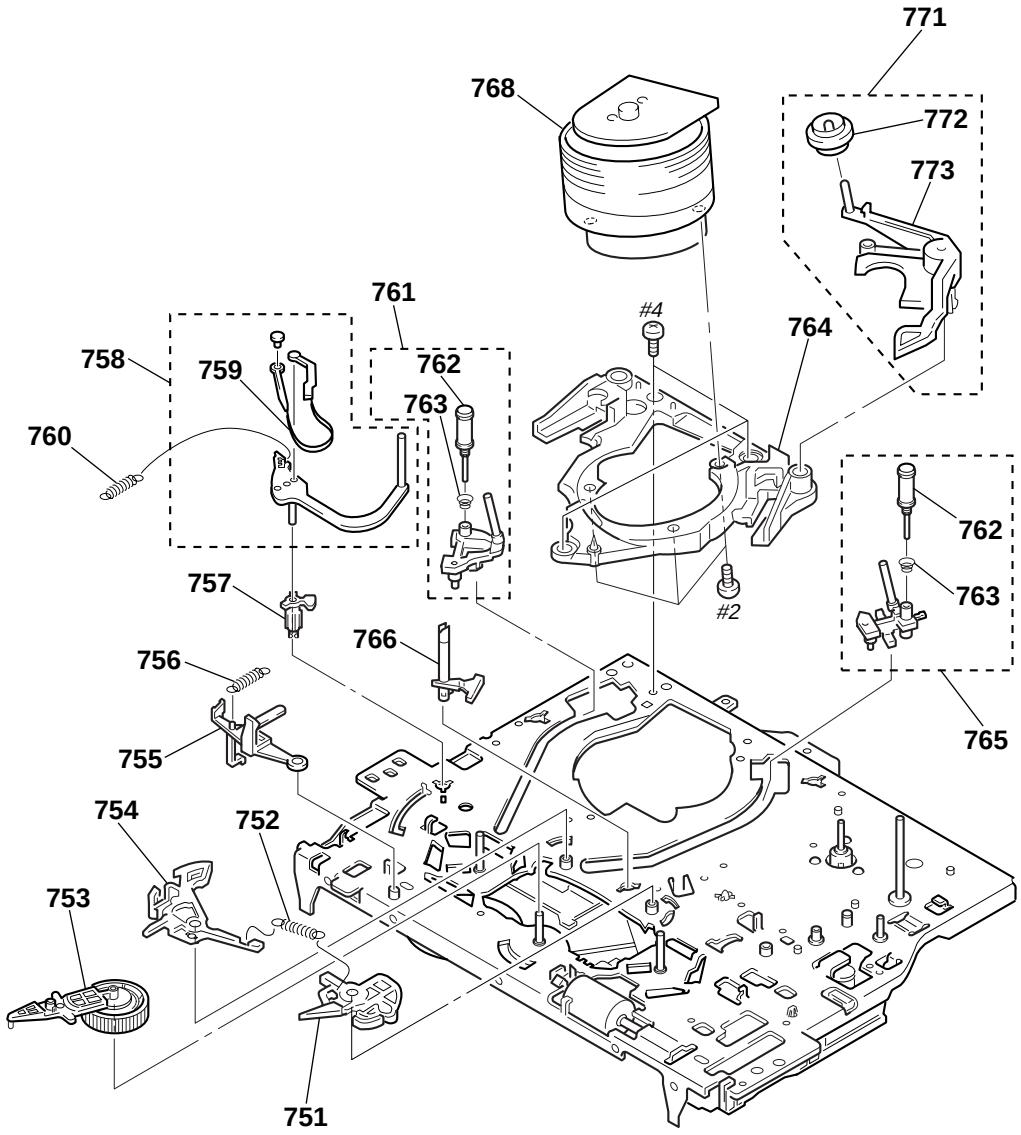
7-1-3. MECHANISM CHASSIS ASSEMBLY (1)



Ref. No.	Part No.	Description	Remark
701	3-977-509-01	WASHER, THRUST	
702	3-977-507-01	TABLE, REEL (S)	
703	3-977-508-01	TABLE, REEL (T)	
704	1-500-144-11	HEAD, FE	
705	3-977-495-01	SHAFT TG2	
706	3-977-494-01	HOLDER, FEH	
707	A-6759-619-B	FL ASSY BOARD, COMPLETE	
708	3-977-535-01	PLATE, LUMINOUS (END SENSOR)	
709	3-977-536-01	PLATE, LUMINOUS (TOP SENSOR)	
710	3-970-471-01	SPRING (DECK OPEN), TORSION	
711	A-6759-615-A	PRESS BLOCK ASSY, PINCH	

Ref. No.	Part No.	Description	Remark
713	3-977-447-01	GEAR, ELEVATOR	
714	3-977-514-01	OPENER, LID	
715	3-977-441-01	GEAR, PINCH PRESSING	
716	3-977-445-01	GEAR, TG8 ARM DRIVING	
717	3-977-465-01	SPRING, EXTENSION (RVS BRAKE)	
718	X-3947-582-1	ARM ASSY, RVS BRAKE	
719	3-977-446-01	GEAR, TG8 ARM	
720	X-3947-590-1	TG8 ASSY	
721	A-6759-620-A	HEAD BLOCK ASSY, ACE (TDK)	
722	3-974-556-01	+ HEXA TT 2.6X9 (TAPER)	
723	3-979-508-01	SCREW +HEXA TP SW 3X8	

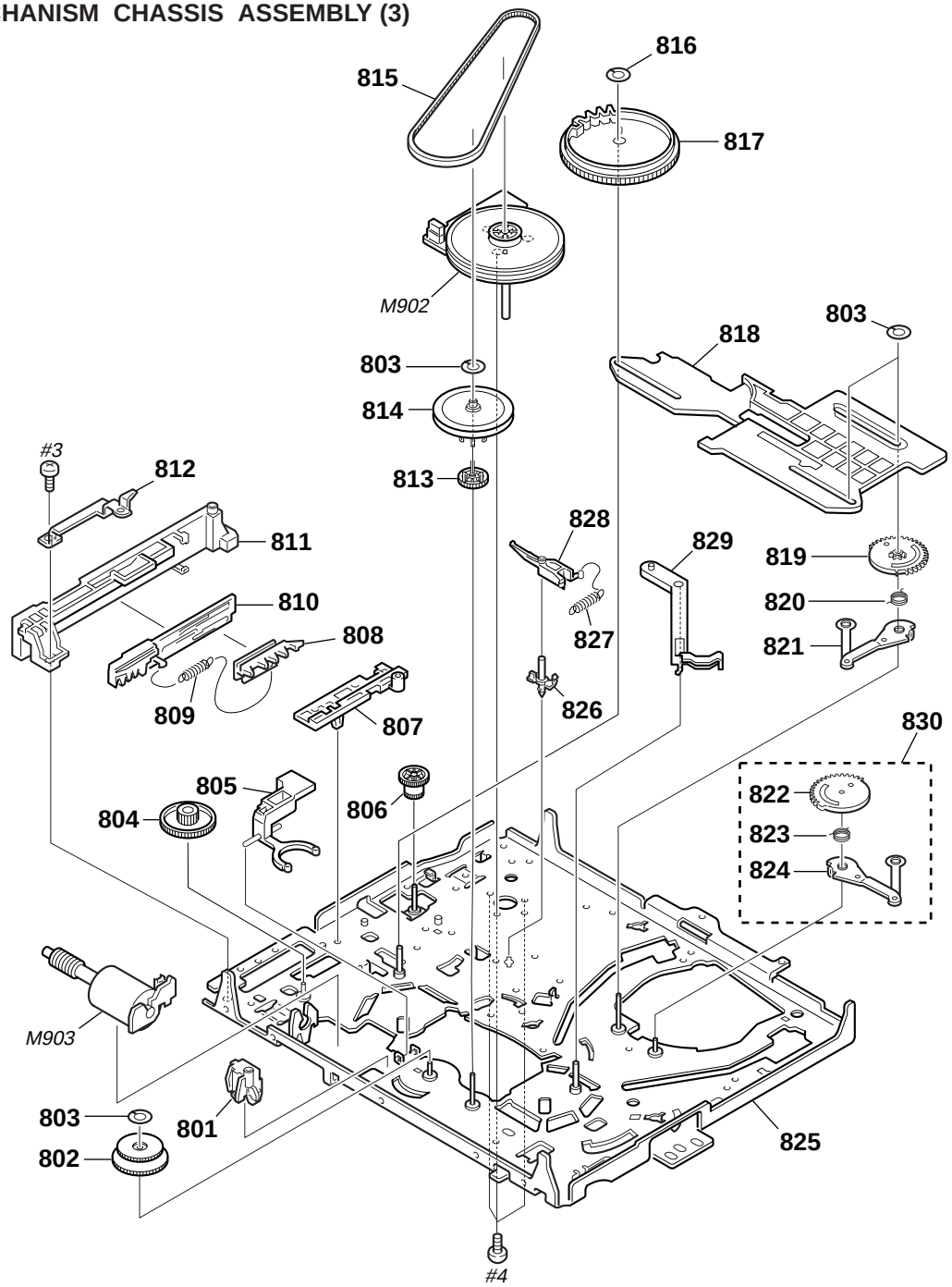
7-1-4. MECHANISM CHASSIS ASSEMBLY (2)



Ref. No.	Part No.	Description	Remark
751	X-3947-581-1	BRAKE ASSY, MAIN (T)	
752	3-977-462-01	SPRING, EXTENTION. (MAIN BRAKE)	
753	X-3947-573-1	ARM ASSY, PENDULUM	
754	X-3947-580-2	BRAKE ASSY, MAIN (S)	
755	3-977-513-02	LEVER, REC. PROOF	
756	3-976-767-01	SPRING, TENS. (REC. PROOF)	
757	3-977-487-01	BOSS, TG1 FULCRUM	
758	X-3947-587-1	TG1 ASSY	
759	X-3947-589-1	BAND ASSY, TG1	
760	3-977-488-01	SPRING (POWER TENSION)	
761	A-6750-324-A	SHUTTLE (S) BLOCK ASSY	
762	X-3944-378-1	ROLLER ASSY, GUIDE	
763	3-965-178-01	SPRING	

Ref. No.	Part No.	Description	Remark
764	3-969-632-04	BASE, DRUM	
765	A-6750-328-E	SHUTTLE (T) BLOCK ASSY	
766	3-977-501-01	PLATE, LUMINOUS	
768	1-772-147-11	DRUM ASSY, DZH-71E-R	(CA30/GA35TW/SA33)
768	1-772-148-11	DRUM ASSY, DZH-89B-R	(GA35: ME, PL, PS, SG, TH/GA55/GA65/SP70)
768	1-772-149-11	DRUM ASSY, DZH-91B-R	(GF85: PS, TH/SP100)
768	1-772-351-11	DRUM ASSY, DZH-90B-R (GF85: PL, TW)	
771	A-6746-074-G	ROLLER BLOCK ASSY, HC	
772	X-3947-255-1	ROLLER ASSY, HC	
773	3-975-724-07	ARM, HC	

7-1-5. MECHANISM CHASSIS ASSEMBLY (3)



Ref. No.	Part No.	Description	Remark
801	3-977-437-01	RETAINER, CAM MOTOR	
802	X-3947-584-1	ASSY, REEL DIRECT	
803	3-977-443-01	WASHER, STOPPER	
804	3-977-438-01	WORM - WHEEL	
805	3-977-506-01	ARM, LIMITTER SELECTION	
806	3-977-444-01	GEAR, PINCH TRANSMISSION	
807	3-977-515-01	GUIDE, FL SLIDER	
808	3-977-517-01	PLATE, SLIDE, FL	
809	3-977-519-01	SPRING, TENS. (LIMIT, FL)	
810	3-977-518-02	PLATE, LIMITTER, FL	
811	3-977-516-01	HOLDER, FL SLIDER	
812	3-977-877-01	PLATE, RETAINER	
813	3-977-504-01	GEAR, CLUTCH	
814	X-3947-585-1	GEAR ASSY, PULLEY	
815	3-977-510-01	BELT, RUBBER	
816	3-977-440-01	WASHER, STOPPER	

Ref. No.	Part No.	Description	Remark
817	3-977-439-01	GEAR, CAM	
818	3-977-442-01	SLIDER	
819	3-977-455-01	GEAR, LOADING (T)	
820	3-977-456-03	SPRING, TORSION (LOAD T)	
821	X-3947-579-1	LEVER ASSY, LOADING (T)	
822	3-977-451-01	GEAR, LOADING (S)	
823	3-977-452-01	SPRING, TORSION (LOAD S)	
824	X-3947-578-1	LEVER ASSY, LOADING (S)	
825	X-3947-576-2	CHASSIS ASSY, MECHANICAL	
826	3-977-468-01	SHAFT, CAPSTAN BRAKE	
827	3-977-467-02	SPRING, CAP BRAKE	
828	X-3947-583-1	BRAKE ASSY, CAPSTAN	
829	3-977-489-01	ARM, TG1 DRIVING	
830	A-6759-616-A	GEAR BLOCK ASSY, LOADING (S)	
M902	1-698-971-11	MOTOR, DC (CAPSTAN)	
M903	X-3947-577-1	MOTOR ASSY, CAM	

7-2. ELECTRICAL PARTS LIST

NOTE:
- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- -XX and -X mean standardized parts, so they may have some difference from the original one.
- RESISTORS
  All resistors are in ohms.
  METAL: Metal-film resistor.
  METAL OXIDE: Metal oxide-film resistor.
  F: nonflammable
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- SEMICONDUCTORS
  In each case, u: µ, for example:
  uA. . : µA. . uPA. . : µPA. .
  uPB. . : µPB. . uPC. . : µPC. .
  uPD. . : µPD. .
- CAPACITORS
  uF: µF
- COILS
  uH: µH

The components identified by mark ⚠ or dotted line with mark ⚠are critical for safety.
Replace only with part number specified.

When indicating parts by reference number, please include the board.

Ref. No.	Part No.	Description			Remark
*	A-6794-720-A	FR-167 BOARD, COMPLETE (GF85PL)			
*	A-6794-721-A	FR-167 BOARD, COMPLETE (GA55: ME, PS, SG, TH/SP70)			
*	A-6794-722-A	FR-167 BOARD, COMPLETE (GA35: ME, PS, SG, TH)			
*	A-6794-723-A	FR-167 BOARD, COMPLETE (GF85: PS, TH/SP100)			
*	A-6794-727-A	FR-167 BOARD, COMPLETE (GA55PL)			
*	A-6794-728-A	FR-167 BOARD, COMPLETE (GA65)			
*	A-6794-729-A	FR-167 BOARD, COMPLETE (GA35PL)			
*	A-6794-731-A	FR-167 BOARD, COMPLETE (CA30/GA35TW/SA33)			
*	A-6794-732-A	FR-167 BOARD, COMPLETE (GF85TW)			
		********** (Ref. No. 1,000 Series)			
		< CAPACITOR >			
C501	1-163-038-00	CERAMIC CHIP	0.1uF		25V
		< CONNECTOR >			
CN501	1-784-449-11	CONNECTOR, FFC/FPC 7P			
		< DIODE >			
D501	8-719-051-17	DIODE SLR-342DC3F (RESOLUTION CONTROL II)			
		< IC >			
IC501	8-749-011-05	IC GP1U28X			
		< RESISTOR >			
R501	1-216-206-00	RES, CHIP	2.2K	5%	1/8W
R502	1-249-424-11	CARBON	3.9K	5%	1/4W
R503	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R504	1-216-075-00	METAL CHIP	12K	5%	1/10W
R506	1-216-055-00	METAL CHIP	1.8K	5%	1/10W
R507	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R508	1-249-424-11	CARBON	3.9K	5%	1/4W
R509	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R510	1-216-295-00	METAL CHIP	0	5%	1/10W (GA35: ME, PS, SG, TH)
R511	1-249-424-11	CARBON	3.9K	5%	1/4W
R512	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R513	1-216-075-00	METAL CHIP	12K	5%	1/10W (GF85: PS, TH/SP100)
R514	1-216-295-00	METAL CHIP	0	5%	1/10W (EXCEPT CA30/GA35/GA55PL/GF85: PL, TW/SA33)
R521	1-216-178-00	RES, CHIP	150	5%	1/8W
		< SWITCH >			
S501	1-762-196-21	SWITCH, TACT (RESOLUTION CONTROL II)			
S502	1-762-196-21	SWITCH, TACT (RESOLUTION CONTROL II)			
S503	1-762-196-21	SWITCH, TACT (RESOLUTION CONTROL II)			
S504	1-762-196-21	SWITCH, TACT (RESOLUTION CONTROL II)			
S505	1-762-196-21	SWITCH, TACT (⏏ EJECT)			
S506	1-762-196-21	SWITCH, TACT (STD PICT)			
S511	1-572-908-11	SWITCH, SLIDE (NTSC PB) (GA35: ME, PS, SG, TH)			
S511	1-572-907-11	SWITCH, SLIDE (NTSC PB) (EXCEPT CA30/GA35/GA55PL/GF85: PL, TW/SA33)			
S512	1-572-907-11	SWITCH, SLIDE (COLOR SYSTEM) (EXCEPT CA30/GA35: PL, TW/GF85: PL, TW/SA33)			
S513	1-572-908-11	SWITCH, SLIDE (TAPE SPEED) (GA55/GA65/GF85: PL, TW/SP70)			

*	A-6713-545-A	MA-366 BOARD, COMPLETE (GF85PL)
*	A-6713-546-A	MA-366 BOARD, COMPLETE (GA55: ME, PS, SG, TH/SP70)
*	A-6713-547-A	MA-366 BOARD, COMPLETE (GA35: ME, PS, SG, TH)
*	A-6713-548-A	MA-366 BOARD, COMPLETE (GF85: PS, TH/SP100)
*	A-6713-551-A	MA-366 BOARD, COMPLETE (GA55PL)
*	A-6713-552-A	MA-366 BOARD, COMPLETE (GA65)
*	A-6713-553-A	MA-366 BOARD, COMPLETE (GA35PL)
*	A-6713-554-A	MA-366 BOARD, COMPLETE (CA30/GA35TW/SA33)
*	A-6713-555-A	MA-366 BOARD, COMPLETE (GA85TW)
		********** (Ref. No. 1,000 Series)
	1-960-158-11	HARNESS (AU-059) (GF85/SP100)
*	3-960-273-01	SPACER, TOP END
*	3-960-274-01	SPACER, LED
	3-970-608-21	SUMITITE (B3), +BV

Ref. No.	Part No.	Description			Remark
		< CAPACITOR >			
C001	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C002	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C003	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C004	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C005	1-124-589-11	ELECT	47uF	20%	16V
C006	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C007	1-124-589-11	ELECT	47uF	20%	16V
C008	1-124-589-11	ELECT	47uF	20%	16V
C009	1-164-489-11	CERAMIC CHIP	0.22uF	10%	16V
C031	1-124-589-11	ELECT	47uF	20%	16V
C032	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C033	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C051	1-124-589-11	ELECT	47uF	20%	16V
C052	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
C053	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C054	1-164-182-11	CERAMIC CHIP	0.0033uF	10%	50V
C055	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C101	1-164-346-11	CERAMIC CHIP	1uF		16V
C102	1-163-021-91	CERAMIC CHIP	0.01uF	10%	50V (GA65)
C102	1-164-232-11	CERAMIC CHIP	0.01uF		50V (EXCEPT GA65)
C103	1-124-589-11	ELECT	47uF	20%	16V
C104	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C105	1-163-243-11	CERAMIC CHIP	47PF	5%	50V
C106	1-163-183-91	CERAMIC CHIP	120PF	5%	50V
C107	1-126-157-11	ELECT	10uF	20%	16V
C108	1-124-234-00	ELECT	22uF	20%	16V
C109	1-124-589-11	ELECT	47uF	20%	16V
C110	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C111	1-126-157-11	ELECT	10uF	20%	16V
C112	1-126-163-11	ELECT	4.7uF	20%	50V
C113	1-163-021-91	CERAMIC CHIP	0.01uF	10%	50V (GA65)
C113	1-164-232-11	CERAMIC CHIP	0.01uF		50V (EXCEPT GA65)
C114	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C115	1-163-243-11	CERAMIC CHIP	47PF	5%	50V
C116	1-163-241-11	CERAMIC CHIP	39PF	5%	50V
C117	1-163-229-11	CERAMIC CHIP	12PF	5%	50V
C118	1-163-021-91	CERAMIC CHIP	0.01uF	10%	50V (GA65)
C118	1-164-232-11	CERAMIC CHIP	0.01uF		50V (EXCEPT GA65)
C119	1-163-231-11	CERAMIC CHIP	15PF	5%	50V
C120	1-163-231-11	CERAMIC CHIP	15PF	5%	50V
C121	1-163-021-91	CERAMIC CHIP	0.01uF	10%	50V (GA65)
C121	1-164-232-11	CERAMIC CHIP	0.01uF		50V (EXCEPT GA65)
C122	1-163-021-91	CERAMIC CHIP	0.01uF	10%	50V (GA65)
C122	1-164-232-11	CERAMIC CHIP	0.01uF		50V (EXCEPT GA65)
C123	1-163-021-91	CERAMIC CHIP	0.01uF	10%	50V (GA65)
C123	1-164-232-11	CERAMIC CHIP	0.01uF		50V (EXCEPT GA65)
C124	1-162-600-11	CERAMIC CHIP	0.0047uF	10%	16V
C125	1-164-346-11	CERAMIC CHIP	1uF		16V
C201	1-164-346-11	CERAMIC CHIP	1uF		16V

Ref. No.	Part No.	Description			Remark
C202	1-163-021-91	CERAMIC CHIP	0.01uF	10%	50V (GA65)
C202	1-164-232-11	CERAMIC CHIP	0.01uF		50V (EXCEPT GA65)
C203	1-163-021-91	CERAMIC CHIP	0.01uF	10%	50V (GA65)
C203	1-164-232-11	CERAMIC CHIP	0.01uF		50V (EXCEPT GA65)
C204	1-163-021-91	CERAMIC CHIP	0.01uF	10%	50V (GA65)
C204	1-164-232-11	CERAMIC CHIP	0.01uF		50V (EXCEPT GA65)
C205	1-163-021-91	CERAMIC CHIP	0.01uF	10%	50V (GA65)
C205	1-164-232-11	CERAMIC CHIP	0.01uF		50V (EXCEPT GA65)
C206	1-163-989-11	CERAMIC CHIP	0.033uF	10%	25V
C207	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C208	1-124-589-11	ELECT	47uF	20%	16V
C209	1-126-162-11	ELECT	3.3uF	20%	50V
C210	1-163-235-11	CERAMIC CHIP	22PF	5%	50V (GF85: PL, TW)
C210	1-163-239-11	CERAMIC CHIP	33PF	5%	50V (EXCEPT GF85/SP100)
C210	1-163-241-11	CERAMIC CHIP	39PF	5%	50V (GF85: PS, TH/SP100)
C211	1-163-235-11	CERAMIC CHIP	22PF	5%	50V (GF85: PL, TW)
C211	1-163-239-11	CERAMIC CHIP	33PF	5%	50V (EXCEPT GF85/SP100)
C211	1-163-241-11	CERAMIC CHIP	39PF	5%	50V (GF85: PS, TH/SP100)
C212	1-163-021-91	CERAMIC CHIP	0.01uF	10%	50V (GA65)
C212	1-164-232-11	CERAMIC CHIP	0.01uF		50V (EXCEPT GA65)
C213	1-163-021-91	CERAMIC CHIP	0.01uF	10%	50V (GA65)
C213	1-164-232-11	CERAMIC CHIP	0.01uF		50V (EXCEPT GA65)
C214	1-163-255-91	CERAMIC CHIP	150PF	5%	50V
C215	1-163-021-91	CERAMIC CHIP	0.01uF	10%	50V (GA65)
C215	1-164-232-11	CERAMIC CHIP	0.01uF		50V (EXCEPT GA65)
C216	1-126-160-11	ELECT	1uF	20%	50V
C217	1-163-017-00	CERAMIC CHIP	0.0047uF	5%	50V
C218	1-124-257-00	ELECT	2.2uF	20%	50V
C219	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C220	1-124-465-00	ELECT	0.47uF	20%	50V
C221	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C222	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C223	1-126-163-11	ELECT	4.7uF	20%	50V
C224	1-124-589-11	ELECT	47uF	20%	16V
C225	1-164-159-11	CERAMIC	0.1uF		50V
C226	1-163-089-00	CERAMIC CHIP	6PF		50V
C227	1-163-255-91	CERAMIC CHIP	150PF	5%	50V
C228	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C229	1-126-163-11	ELECT	4.7uF	20%	50V
C230	1-163-231-11	CERAMIC CHIP	15PF	5%	50V (GF85: PS, TH/SP100)
C230	1-163-235-11	CERAMIC CHIP	22PF	5%	50V (EXCEPT GF85/SP100)

Ref. No.	Part No.	Description			Remark
C231	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C232	1-163-233-11	CERAMIC CHIP	18PF	5%	50V (GF85: PL, TW)
C232	1-163-235-11	CERAMIC CHIP	22PF	5%	50V (EXCEPT GF85/SP100)
C232	1-163-237-11	CERAMIC CHIP	27PF	5%	50V (GF85: PS, TH/SP100)
C233	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C234	1-124-589-11	ELECT	47uF	20%	16V
C235	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C236	1-164-159-11	CERAMIC	0.1uF		50V
C237	1-162-306-11	CERAMIC	0.01uF	20%	16V
C238	1-126-157-11	ELECT	10uF	20%	16V
C239	1-163-021-91	CERAMIC CHIP	0.01uF	10%	50V (GA65)
C239	1-164-232-11	CERAMIC CHIP	0.01uF		50V (EXCEPT GA65)
C240	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C241	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C242	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C243	1-126-162-11	ELECT	3.3uF	20%	50V
C244	1-163-259-91	CERAMIC CHIP	220PF	5%	50V
C245	1-126-157-11	ELECT	10uF	20%	16V
C246	1-163-021-91	CERAMIC CHIP	0.01uF	10%	50V (GA65)
C246	1-164-232-11	CERAMIC CHIP	0.01uF		50V (EXCEPT GA65)
C247	1-164-489-11	CERAMIC CHIP	0.22uF	10%	16V
C248	1-124-257-00	ELECT	2.2uF	20%	50V
C249	1-163-021-91	CERAMIC CHIP	0.01uF	10%	50V (GA65)
C249	1-164-232-11	CERAMIC CHIP	0.01uF		50V (EXCEPT GA65)
C250	1-124-589-11	ELECT	47uF	20%	16V
C251	1-164-346-11	CERAMIC CHIP	1uF		16V
C252	1-163-263-11	CERAMIC CHIP	330PF	5%	50V
C253	1-164-232-11	CERAMIC CHIP	0.01uF		50V (CA30/GA35/SA33)
C254	1-163-087-00	CERAMIC CHIP	4PF		50V
C257	1-124-589-11	ELECT	47uF	20%	16V
C258	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C259	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C261	1-124-589-11	ELECT	47uF	20%	16V
C262	1-163-113-00	CERAMIC CHIP	68PF	5%	50V
C263	1-163-239-11	CERAMIC CHIP	33PF	5%	50V
C264	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C265	1-124-589-11	ELECT	47uF	20%	16V
C266	1-162-638-91	CERAMIC CHIP	1uF		16V
C267	1-163-245-11	CERAMIC CHIP	56PF	5%	50V (EXCEPT GF85: PL, TW)
C268	1-109-982-11	CERAMIC CHIP	1uF	10%	10V (EXCEPT GF85: PL, TW)
C269	1-163-021-91	CERAMIC CHIP	0.01uF	10%	50V (GA65)
C269	1-164-232-11	CERAMIC CHIP	0.01uF		50V (EXCEPT GA65)
C270	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C290	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C303	1-163-038-00	CERAMIC CHIP	0.1uF		25V (GF85/SP100)
C304	1-163-038-00	CERAMIC CHIP	0.1uF		25V (GF85/SP100)
C305	1-163-135-00	CERAMIC CHIP	560PF	5%	50V (GF85/SP100)
C306	1-124-589-11	ELECT	47uF	20%	16V (GF85/SP100)
C307	1-124-589-11	ELECT	47uF	20%	16V (GF85/SP100)
C308	1-126-157-11	ELECT	10uF	20%	16V (GF85/SP100)
C309	1-163-020-00	CERAMIC CHIP	0.0082uF	10%	50V (GF85/SP100)
C310	1-124-589-11	ELECT	47uF	20%	16V (GF85/SP100)
C311	1-126-157-11	ELECT	10uF	20%	16V (GF85/SP100)
C312	1-124-257-00	ELECT	2.2uF	20%	50V (GF85/SP100)
C313	1-126-157-11	ELECT	10uF	20%	16V (GF85/SP100)
C314	1-124-589-11	ELECT	47uF	20%	16V (GF85/SP100)
C315	1-163-020-00	CERAMIC CHIP	0.0082uF	10%	50V (GF85/SP100)
C316	1-126-157-11	ELECT	10uF	20%	16V (GF85/SP100)
C317	1-109-982-11	CERAMIC CHIP	1uF	10%	10V (GF85/SP100)
C318	1-109-982-11	CERAMIC CHIP	1uF	10%	10V (GF85/SP100)
C319	1-126-157-11	ELECT	10uF	20%	16V (GF85/SP100)
C320	1-126-157-11	ELECT	10uF	20%	16V (GF85/SP100)
C321	1-164-346-11	CERAMIC CHIP	1uF		16V (GF85/SP100)
C322	1-126-157-11	ELECT	10uF	20%	16V (GF85/SP100)
C323	1-163-038-00	CERAMIC CHIP	0.1uF		25V (GF85/SP100)
C324	1-164-232-11	CERAMIC CHIP	0.01uF		50V (GF85/SP100)
C334	1-126-160-11	ELECT	1uF	20%	50V (GF85/SP100)
C335	1-126-160-11	ELECT	1uF	20%	50V (GF85/SP100)
C336	1-126-157-11	ELECT	10uF	20%	16V (GF85/SP100)
C340	1-163-038-00	CERAMIC CHIP	0.1uF		25V (GF85/SP100)
C351	1-164-346-11	CERAMIC CHIP	1uF		16V
C352	1-124-589-11	ELECT	47uF	20%	16V
C353	1-126-157-11	ELECT	10uF	20%	16V
C354	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C355	1-124-234-00	ELECT	22uF	20%	16V
C356	1-126-163-11	ELECT	4.7uF	20%	50V
C357	1-164-161-11	CERAMIC CHIP	0.0022uF	10%	100V
C358	1-163-012-00	CERAMIC CHIP	0.0018uF	10%	50V
C359	1-126-163-11	ELECT	4.7uF	20%	50V
C360	1-126-163-11	ELECT	4.7uF	20%	50V
C361	1-109-982-11	CERAMIC CHIP	1uF	10%	10V
C362	1-124-234-00	ELECT	22uF	20%	16V
C363	1-163-021-91	CERAMIC CHIP	0.01uF	10%	50V (GA65)
C363	1-164-232-11	CERAMIC CHIP	0.01uF		50V (EXCEPT GA65)

Ref. No.	Part No.	Description				Remark
C364	1-126-163-11	ELECT	4.7uF	20%	50V	
C371	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V	
C372	1-126-157-11	ELECT	10uF	20%	16V	
C373	1-137-360-11	MYLAR	220PF	5%	50V	
			(EXCEPT CA30/GA35/SA33)			
C374	1-163-038-00	CERAMIC CHIP	0.1uF		25V	
			(EXCEPT CA30/GA35/SA33)			
C375	1-137-374-11	MYLAR	0.047uF	5%	50V	
			(EXCEPT CA30/GA35/SA33)			
C376	1-164-182-11	CERAMIC CHIP	0.0033uF	10%	50V	
			(EXCEPT CA30/GA35/SA33)			
C377	1-163-021-91	CERAMIC CHIP	0.01uF	10%	50V	
						(GA65)
C377	1-164-232-11	CERAMIC CHIP	0.01uF		50V	
			(EXCEPT CA30/GA35/SA33/GA65)			
C378	1-124-589-11	ELECT	47uF	20%	16V	
			(EXCEPT CA30/GA35/SA33)			
C379	1-163-038-00	CERAMIC CHIP	0.1uF		25V	
			(EXCEPT CA30/GA35/SA33)			
C380	1-124-589-11	ELECT	47uF	20%	16V	
C381	1-109-982-11	CERAMIC CHIP	1uF	10%	10V	
C382	1-163-245-11	CERAMIC CHIP	56PF	5%	50V	
			(EXCEPT CA30/GA35/SA33)			
⚠C601	1-104-705-11	MYLAR	0.1uF	20%	250V	
⚠C602	1-104-705-11	MYLAR	0.1uF	20%	250V	
⚠C603	1-113-898-11	CERAMIC	330PF	10%	250V	
⚠C604	1-113-898-11	CERAMIC	330PF	10%	250V	
⚠C605	1-113-898-11	CERAMIC	330PF	10%	250V	
⚠C606	1-107-405-11	ELECT (BLOCK)	68uF	20%	400V	
C607	1-107-925-11	ELECT	1uF	20%	100V	
C608	1-136-160-00	MYLAR	0.039uF	5%	50V	
C609	1-107-974-11	CERAMIC	47PF	5%	2KV	
C610	1-136-203-11	MYLAR	0.01uF	10%	400V	
C611	1-104-683-11	MYLAR	0.0047uF	5%	50V	
C612	1-163-259-91	CERAMIC CHIP	220PF	5%	50V	
C613	1-126-160-11	ELECT	1uF	20%	50V	
C614	1-126-926-11	ELECT	1000uF	20%	10V	
C615	1-126-767-11	ELECT	1000uF	20%	16V	
C616	1-126-941-11	ELECT	470uF	20%	25V	
C617	1-126-935-11	ELECT	470uF	20%	16V	
C618	1-124-589-11	ELECT	47uF	20%	16V	
C619	1-163-038-00	CERAMIC CHIP	0.1uF		25V	
C620	1-163-038-00	CERAMIC CHIP	0.1uF		25V	
C621	1-163-038-00	CERAMIC CHIP	0.1uF		25V	
C626	1-163-038-00	CERAMIC CHIP	0.1uF		25V	
C627	1-163-038-00	CERAMIC CHIP	0.1uF		25V	
C628	1-163-038-00	CERAMIC CHIP	0.1uF		25V	
C630	1-163-038-00	CERAMIC CHIP	0.1uF		25V	
C901	1-124-589-11	ELECT	47uF	20%	16V	
C902	1-126-160-11	ELECT	1uF	20%	50V	
			(EXCEPT CA30/GA35/SA33)			
C903	1-128-057-11	ELECT	330uF	20%	6.3V	
C906	1-124-589-11	ELECT	47uF	20%	16V	
C907	1-163-038-00	CERAMIC CHIP	0.1uF		25V	
		< CONNECTOR >				
CN001	1-695-330-31	HOUSING, CONNECTOR 7P				
* CN031	1-766-716-11	CONNECTOR, BOARD TO BOARD 3P				
CN051	1-779-723-11	CONNECTOR, BOARD TO BOARD 9P				

Ref. No.	Part No.	Description	Remark
CN201	1-691-040-41	HOUSING, CONNECTOR 8P	
* CN202	1-560-892-00	PIN, CONNECTOR 4P	
* CN331	1-568-955-11	PIN, CONNECTOR 6P (EXCEPT GA65)	
* CN331	1-573-129-11	PIN, CONNECTOR 6P (GA65)	
CN332	1-506-468-11	PIN, CONNECTOR 3P	(EXCEPT CA30/GA35/SA33)
CN401	1-784-486-11	CONNECTOR, FFC/FPC 7P	
⚠CN601	1-580-230-11	PIN, CONNECTOR (PC BOARD) 2P	(EXCEPT GA65)
CN601	1-774-108-11	PIN, CONNECTOR (PC BOARD) (GA65)	
		< DIODE >	
D001	8-719-048-26	DIODE GL528V1 (T/S. LED)	
D101	8-719-911-19	DIODE 1SS119-25TD	
D401	8-719-056-07	DIODE SLR-342MCT31 (ON/STANDBY)	
D402	8-719-045-62	DIODE SLR-342VCT31 (ON/STANDBY)	(EXCEPT CA30/GA35: PL, TW/ GA55PL/GF85: PL, TW/SA33)
D403	8-719-056-07	DIODE SLR-342MCT31 (DANCE 1)	
D404	8-719-056-07	DIODE SLR-342MCT31 (DANCE 2)	
D405	8-719-056-07	DIODE SLR-342MCT31 (DANCE 4)	
D406	8-719-056-07	DIODE SLR-342MCT31 (DANCE 3)	
D407	8-719-056-07	DIODE SLR-342MCT31 (TAPE INSIDE)	
D408	8-719-045-62	DIODE SLR-342VCT31 (● REC)	(EXCEPT CA30/GA35/SA33)
D409	8-719-056-07	DIODE SLR-342MCT31 (L) (GF85/SP100)	
D410	8-719-056-07	DIODE SLR-342MCT31 (HiFi) (GF85/SP100)	
D411	8-719-056-07	DIODE SLR-342MCT31 (R) (GF85/SP100)	
D412	8-719-056-07	DIODE SLR-342MCT31 (VIDEO)	(CA30/GA35: PL, TW/GA55PL/ GF85: PL, TW/SA33)
D413	8-719-045-62	DIODE SLR-342VCT31 (SYNCHRO REC)	(EXCEPT CA30/GA35/SA33)
⚠D601	8-719-051-93	DIODE DF06M-6031	
D602	8-719-109-89	DIODE RD5.6ES-T1B2	
D603	8-719-110-47	DIODE RD18ES-T1B (EXCEPT GA65)	
D603	8-719-113-37	DIODE RD18ES-T2B (GA65)	
D604	8-719-054-32	DIODE ERA15-06TP3	
D605	8-719-911-19	DIODE 1SS119-25TD	
D606	8-719-911-19	DIODE 1SS119-25TD	
D607	8-719-109-59	DIODE RD2.7ES-T1B1	
D608	8-719-030-25	DIODE EG01CV0 (EXCEPT GA65)	
D608	8-719-030-33	DIODE EG01CV1 (GA65)	
D609	8-719-911-19	DIODE 1SS119-25TD	
D610	8-719-022-97	DIODE D2S4MF	
D611	8-719-073-18	DIODE S3L20UF34	
D612	8-719-110-18	DIODE RD10ES-T1B3	
D613	8-719-160-64	DIODE RD16F-T8B1	
D901	8-719-108-12	DIODE RD9.1EW-T1 (GF85/SP100)	
D902	8-719-108-12	DIODE RD9.1EW-T1 (GF85/SP100)	
		< EARTH TERMINAL >	
ET001	1-537-770-21	TERMINAL, EARTH	
		< FUSE >	
⚠F601	1-532-388-31	FUSE (2.0A/250V)	

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref. No.	Part No.	Description	Remark
		< FUSE HOLDER >	
FH601	1-533-223-11	HOLDER, FUSE	
FH602	1-533-223-11	HOLDER, FUSE	
		< IC >	
IC031	8-759-481-46	IC LB1943	
IC101	8-759-599-42	IC HD6433975RA-CPAF	
IC102	8-759-248-87	IC MM1256XF-BE	
⚠IC103	8-759-991-41	IC L78L05ACZ-AP	
IC201	8-759-589-31	IC HA118217F	(EXCEPT CA30/GA35: PL, TW/ GA55PL/GF85: PL, TW/SA33)
IC201	8-759-589-32	IC HA118217NF	(CA30/GA35: PL, TW/GA55PL/ GF85: PL, TW/SA33)
IC301	8-759-638-56	IC TDA9605H/N2, 557 (GF85/SP100)	
⚠IC601	8-759-321-95	IC HA17431PA-TZ	
		< JACK >	
* J901	1-779-924-11	JACK, PIN 2P (LINE-1 OUT)	(CA30/GA35/SA33)
J901	1-779-010-11	JACK, PIN 4P (LINE-1 IN/OUT)	(GA55/GA65/SP70)
J901	1-779-011-11	JACK, PIN 6P (LINE-1 IN/OUT) (GF85/SP100)	
		< JUMPER RESISTOR >	
JR002	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR003	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR004	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR005	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR007	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR008	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR009	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR010	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR011	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR012	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR013	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR014	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR100	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR101	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR102	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR103	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR104	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR105	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR107	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR108	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR109	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR110	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR111	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR112	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR113	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR114	1-216-296-00	METAL CHIP 0 5% 1/8W	
JS371	1-216-295-00	METAL CHIP 0 5% 1/10W	(CA30/GA35/SA33)
JS372	1-216-295-00	METAL CHIP 0 5% 1/10W	(EXCEPT GF85/SP100)

Ref. No.	Part No.	Description	Remark
		< COIL >	
L101	1-410-511-11	INDUCTOR	15uH
L201	1-414-857-51	INDUCTOR	100uH
L202	1-414-151-31	INDUCTOR	470uH (EXCEPT GA65)
L202	1-414-151-21	INDUCTOR	470uH (GA65)
L203	1-414-857-51	INDUCTOR	100uH
L204	1-410-510-11	INDUCTOR	12uH
L205	1-410-520-11	INDUCTOR	82uH
L206	1-414-857-51	INDUCTOR	100uH
L207	1-414-857-51	INDUCTOR	100uH
L208	1-410-519-11	INDUCTOR	68uH
L210	1-414-856-51	INDUCTOR	10uH
L261	1-410-513-11	INDUCTOR	22uH (EXCEPT GF85: PL, TW)
L262	1-410-503-11	INDUCTOR	3.3uH
L301	1-414-857-51	INDUCTOR	100uH (GF85/SP100)
L302	1-414-856-51	INDUCTOR	10uH (GF85/SP100)
L351	1-414-857-51	INDUCTOR	100uH
L371	1-414-857-51	INDUCTOR	100uH (EXCEPT CA30/GA35/SA33)
L372	1-414-187-11	INDUCTOR	47uH (EXCEPT CA30/GA35/SA33)
L601	1-410-858-21	INDUCTOR	0uH
L602	1-412-529-11	INDUCTOR	22uH
L603	1-412-529-11	INDUCTOR	22uH
L901	1-414-857-51	INDUCTOR	100uH
		< LINE FILTER >	
LF601	1-416-929-11	FILTER, LINE	
		< PHOTO INTERRUPTER >	
PH001	8-749-013-23	PHOTO INTERRUPTER GP3S120 (T REEL)	
PH002	8-749-013-23	PHOTO INTERRUPTER GP3S120 (S REEL)	
⚠PH601	8-749-010-65	PHOTO COUPLER PC123FY2	
		< IC LINK >	
⚠PS601	1-533-588-31	LINK, IC (0.5A)	
⚠PS602	1-533-590-31	LINK, IC (1.0A)	
		< TRANSISTOR >	
Q001	8-729-042-88	TRANSISTOR	RPT-37PBT32 (T SENS)
Q002	8-729-042-88	TRANSISTOR	RPT-37PBT32 (S SENS)
Q003	8-729-106-68	TRANSISTOR	2SD1664-T100-R
Q201	8-729-230-49	TRANSISTOR	2SC2712Y-TE85L
Q202	8-729-421-19	TRANSISTOR	UN2213-TX
Q203	8-729-421-19	TRANSISTOR	UN2213-TX (EXCEPT CA30/GA35: PL, TW/ GA55PL/GF85: PL, TW/SA33)
Q204	8-729-421-19	TRANSISTOR	UN2213-TX
Q205	8-729-216-21	TRANSISTOR	2SA1162Y-TE85L
Q261	8-729-421-19	TRANSISTOR	UN2213-TX
Q262	8-729-230-49	TRANSISTOR	2SC2712Y-TE85L
Q263	8-729-421-19	TRANSISTOR	UN2213-TX
Q264	8-729-216-21	TRANSISTOR	2SA1162Y-TE85L
Q265	8-729-230-49	TRANSISTOR	2SC2712L-TE85L (EXCEPT GF85: PL, TW)
Q266	8-729-230-49	TRANSISTOR	2SC2712Y-TE85L
Q267	8-729-230-49	TRANSISTOR	2SC2712Y-TE85L

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref. No.	Part No.	Description				Remark
Q290	8-729-421-19	TRANSISTOR	UN2213-TX			
Q291	8-729-421-19	TRANSISTOR	UN2213-TX			
Q292	8-729-421-19	TRANSISTOR	UN2213-TX			
Q293	8-729-421-19	TRANSISTOR	UN2213-TX			
Q294	8-729-043-69	TRANSISTOR	UN2225- (TX). S0			
Q295	8-729-043-69	TRANSISTOR	UN2225- (TX). S0			
Q296	8-729-421-19	TRANSISTOR	UN2213-TX			
Q297	8-729-421-19	TRANSISTOR	UN2213-TX			
Q298	8-729-043-69	TRANSISTOR	UN2225- (TX). S0			
Q299	8-729-230-49	TRANSISTOR	2SC2712Y-TE85L			
Q371	8-729-230-49	TRANSISTOR	2SC2712Y-TE85L			
Q372	8-729-230-49	TRANSISTOR	2SC2712Y-TE85L			(EXCEPT CA30/GA35/SA33)
Q373	8-729-230-49	TRANSISTOR	2SC2712Y-TE85L			(EXCEPT CA30/GA35/SA33)
Q374	8-729-424-18	TRANSISTOR	UN2113-TX			(EXCEPT CA30/GA35/SA33)
Q375	8-729-012-31	TRANSISTOR	2SC4040-TL2-Q			(EXCEPT CA30/GA35/SA33)
Q376	8-729-424-56	TRANSISTOR	UN211L-TX			(EXCEPT CA30/GA35/SA33)
Q377	8-729-421-19	TRANSISTOR	UN2213-TX			(EXCEPT CA30/GA35/SA33)
Q378	8-729-421-19	TRANSISTOR	UN2213-TX			(EXCEPT CA30/GA35/SA33)
Q401	8-729-421-19	TRANSISTOR	UN2213-TX			
Q402	8-729-421-19	TRANSISTOR	UN2213-TX			(EXCEPT CA30/GA35/SA33)
Q403	8-729-421-19	TRANSISTOR	UN2213-TX (GF85/SP100)			
Q404	8-729-421-19	TRANSISTOR	UN2213-TX (GF85/SP100)			
Q405	8-729-421-19	TRANSISTOR	UN2213-TX (GF85/SP100)			
Q406	8-729-421-19	TRANSISTOR	UN2213-TX			(CA30/GA35: PL, TW/GA55PL/ GF85: PL, TW/SA33)
Q407	8-729-421-19	TRANSISTOR	UN2213-TX			(EXCEPT CA30/GA35/SA33)
Q408	8-729-421-19	TRANSISTOR	UN2213-TX			
Q601	8-729-230-49	TRANSISTOR	2SC2712Y-TE85L			
Q602	8-729-012-31	TRANSISTOR	2SC4040-TL2-Q			
Q603	8-729-043-47	TRANSISTOR	2SK2671			
⚠Q604	8-729-012-31	TRANSISTOR	2SC4040-TL2-Q			
Q901	8-729-216-21	TRANSISTOR	2SA1162Y-TE85L			
		< RESISTOR >				
R001	1-247-815-91	CARBON	220	5%	1/4W	(EXCEPT GA65)
R001	1-249-409-11	CARBON	220	5%	1/4W	(GA65)
R002	1-247-815-91	CARBON	220	5%	1/4W	(EXCEPT GA65)
R002	1-249-409-11	CARBON	220	5%	1/4W	(GA65)
R003	1-249-421-11	CARBON	2.2K	5%	1/4W	
R004	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R005	1-247-807-31	CARBON	100	5%	1/4W	
R006	1-247-807-31	CARBON	100	5%	1/4W	
R007	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R008	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R009	1-216-073-00	METAL CHIP	10K	5%	1/10W	

Ref. No.	Part No.	Description				Remark
R031	1-247-863-91	CARBON	22K	5%	1/4W	(EXCEPT GA65)
R031	1-249-433-11	CARBON	22K	5%	1/4W	(GA65)
R032	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R033	1-216-077-91	RES, CHIP	15K	5%	1/10W	
R051	1-216-222-00	RES, CHIP	10K	5%	1/8W	
R052	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R053	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R054	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R055	1-216-037-00	METAL CHIP	330	5%	1/10W	
R056	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R101	1-216-170-00	RES, CHIP	68	5%	1/8W	
R102	1-249-403-11	CARBON	68	5%	1/4W	
R103	1-216-021-00	METAL CHIP	68	5%	1/10W	
R104	1-216-021-00	METAL CHIP	68	5%	1/10W	
R105	1-216-105-91	RES, CHIP	220K	5%	1/10W	
R106	1-249-435-11	CARBON	33K	5%	1/4W	
R107	1-247-863-91	CARBON	22K	5%	1/4W	(EXCEPT GA65)
R107	1-249-433-11	CARBON	22K	5%	1/4W	(GA65)
R108	1-249-437-11	CARBON	47K	5%	1/4W	
R109	1-216-222-00	RES, CHIP	10K	5%	1/8W	
R110	1-216-222-00	RES, CHIP	10K	5%	1/8W	
R111	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R112	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R113	1-216-085-00	METAL CHIP	33K	5%	1/10W	
R114	1-216-099-00	METAL CHIP	120K	5%	1/10W	
R115	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R116	1-216-121-91	RES, CHIP	1M	5%	1/10W	
R117	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R118	1-247-895-00	CARBON	470K	5%	1/4W	
R119	1-216-001-00	METAL CHIP	10	5%	1/10W	
R120	1-216-055-00	METAL CHIP	1.8K	5%	1/10W	
R121	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R122	1-216-121-91	RES, CHIP	1M	5%	1/10W	
R123	1-216-121-91	RES, CHIP	1M	5%	1/10W	
R124	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R125	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R126	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R127	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R128	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R129	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R130	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R131	1-216-238-91	RES, CHIP	47K	5%	1/8W	
R132	1-249-429-11	CARBON	10K	5%	1/4W	
R133	1-247-863-91	CARBON	22K	5%	1/4W	(GF85/SP100)
R134	1-249-437-11	CARBON	47K	5%	1/4W	
R135	1-249-429-11	CARBON	10K	5%	1/4W	
R136	1-247-831-91	CARBON	1K	5%	1/4W	(EXCEPT GA65)
R136	1-249-417-11	CARBON	1K	5%	1/4W	(GA65)
R137	1-247-831-91	CARBON	1K	5%	1/4W	(EXCEPT GA65)
R137	1-249-417-11	CARBON	1K	5%	1/4W	(GA65)

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Ref. No.	Part No.	Description			Remark
R138	1-249-429-11	CARBON	10K	5%	1/4W
					(GF85/SP100)
R139	1-249-429-11	CARBON	10K	5%	1/4W
					(GF85/SP100)
R140	1-249-429-11	CARBON	10K	5%	1/4W
R141	1-216-073-00	METAL CHIP	10K	5%	1/10W
R142	1-216-073-00	METAL CHIP	10K	5%	1/10W
R143	1-216-079-00	METAL CHIP	18K	5%	1/10W
					(GF85/SP100)
R144	1-249-429-11	CARBON	10K	5%	1/4W
R145	1-216-089-00	METAL CHIP	47K	5%	1/10W
					(EXCEPT CA30/GA35/SA33)
R146	1-216-073-00	METAL CHIP	10K	5%	1/10W
R201	1-216-073-00	METAL CHIP	10K	5%	1/10W
R202	1-216-049-00	METAL CHIP	1K	5%	1/10W
R203	1-216-045-00	METAL CHIP	680	5%	1/10W
					(EXCEPT CA30/GA35TW/GF85: PL, TW/SA33)
R203	1-216-047-91	RES, CHIP	820	5%	1/10W
					(CA30/GA35TW/GF85: PL, TW/SA33)
R204	1-216-083-00	METAL CHIP	27K	5%	1/10W
R205	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R206	1-216-055-00	METAL CHIP	1.8K	5%	1/10W
R207	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R208	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
					(EXCEPT GF85/SP100)
R208	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
					(GF85: PS, TH/SP100)
R209	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
					(EXCEPT CA30/GA35TW/GF85: PL, TW/SA33)
R209	1-216-073-00	METAL CHIP	10K	5%	1/10W
					(CA30/GA35TW/GF85: PL, TW/SA33)
R210	1-216-045-00	METAL CHIP	680	5%	1/10W
R211	1-216-039-00	METAL CHIP	390	5%	1/10W
R212	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R213	1-216-073-00	METAL CHIP	10K	5%	1/10W
R254	1-216-073-00	METAL CHIP	10K	5%	1/10W
R260	1-216-033-00	METAL CHIP	220	5%	1/10W
					(CA30/GA35/SA33)
R260	1-216-182-00	RES, CHIP	220	5%	1/8W
					(EXCEPT CA30/GA35/SA33)
R261	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R262	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R263	1-216-071-00	METAL CHIP	8.2K	5%	1/10W
R264	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
					(EXCEPT GF85: PL, TW)
R265	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R266	1-216-089-00	METAL CHIP	47K	5%	1/10W
R267	1-216-079-00	METAL CHIP	18K	5%	1/10W
R268	1-216-049-00	METAL CHIP	1K	5%	1/10W
R269	1-216-037-00	METAL CHIP	330	5%	1/10W
R270	1-216-019-00	METAL CHIP	56	5%	1/10W
R271	1-249-429-11	CARBON	10K	5%	1/4W
					(EXCEPT GF85: PL, TW)
R290	1-216-045-00	METAL CHIP	680	5%	1/10W
R291	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R292	1-216-047-91	RES, CHIP	820	5%	1/10W
R293	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R294	1-216-081-00	METAL CHIP	22K	5%	1/10W
R295	1-216-073-00	METAL CHIP	10K	5%	1/10W
R296	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R297	1-216-089-00	METAL CHIP	47K	5%	1/10W
R298	1-216-081-00	METAL CHIP	22K	5%	1/10W

Ref. No.	Part No.	Description			Remark
R301	1-216-073-00	METAL CHIP	10K	5%	1/10W
					(GF85/SP100)
R306	1-216-083-00	METAL CHIP	27K	5%	1/10W
					(GF85/SP100)
R307	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
					(GF85/SP100)
R308	1-208-820-11	METAL CHIP	39K	0.5%	1/10W
					(GF85/SP100)
R311	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
					(GF85/SP100)
R312	1-216-083-00	METAL CHIP	27K	5%	1/10W
					(GF85/SP100)
R313	1-216-133-00	METAL CHIP	3.3M	5%	1/10W
					(GF85/SP100)
R322	1-216-097-00	METAL CHIP	100K	5%	1/10W
					(GF85/SP100)
R329	1-216-041-00	METAL CHIP	470	5%	1/10W
					(GF85/SP100)
R351	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R352	1-216-103-00	METAL CHIP	180K	5%	1/10W
R353	1-216-027-00	METAL CHIP	120	5%	1/10W
R354	1-216-081-00	METAL CHIP	22K	5%	1/10W
R355	1-216-073-00	METAL CHIP	10K	5%	1/10W
					(EXCEPT CA30/GA35/SA33)
R356	1-216-083-00	METAL CHIP	27K	5%	1/10W
R357	1-216-073-00	METAL CHIP	10K	5%	1/10W
					(EXCEPT CA30/GA35/SA33)
R358	1-216-125-00	METAL CHIP	1.5M	5%	1/10W
R359	1-249-437-11	CARBON	47K	5%	1/4W
					(EXCEPT CA30/GA35/SA33)
R360	1-216-077-91	RES, CHIP	15K	5%	1/10W
R361	1-216-041-00	METAL CHIP	470	5%	1/10W
R362	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R363	1-259-880-11	CARBON	2.2M	5%	1/4W
R371	1-249-411-11	CARBON	330	5%	1/4W
R372	1-249-411-11	CARBON	330	5%	1/4W
R373	1-216-049-00	METAL CHIP	1K	5%	1/10W
R374	1-216-049-00	METAL CHIP	1K	5%	1/10W
R375	1-216-073-00	METAL CHIP	10K	5%	1/10W
					(EXCEPT CA30/GA35/SA33)
R376	1-216-073-00	METAL CHIP	10K	5%	1/10W
					(EXCEPT CA30/GA35/SA33)
R377	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
					(EXCEPT CA30/GA35/SA33)
R378	1-216-079-00	METAL CHIP	18K	5%	1/10W
					(EXCEPT CA30/GA35/SA33)
R379	1-216-083-00	METAL CHIP	27K	5%	1/10W
					(EXCEPT CA30/GA35/SA33)
R380	1-249-393-11	CARBON	10	5%	1/4W
					(EXCEPT CA30/GA35/SA33)
R381	1-216-033-00	METAL CHIP	220	5%	1/10W
					(EXCEPT CA30/GA35/SA33)
R400	1-216-063-91	RES, CHIP	3.9K	5%	1/10W
R401	1-216-035-00	METAL CHIP	270	5%	1/10W
R402	1-216-035-00	METAL CHIP	270	5%	1/10W
					(EXCEPT CA30/GA35: PL, TW/ GA55PL/GF85: PL, TW/SA33)
R403	1-249-410-11	CARBON	270	5%	1/4W
R404	1-249-410-11	CARBON	270	5%	1/4W
R405	1-249-410-11	CARBON	270	5%	1/4W
R406	1-216-055-00	METAL CHIP	1.8K	5%	1/10W
R407	1-249-410-11	CARBON	270	5%	1/4W
R408	1-249-421-11	CARBON	2.2K	5%	1/4W

Ref. No.	Part No.	Description			Remark
R409	1-216-035-00	METAL CHIP	270	5%	1/10W
R410	1-216-184-00	RES, CHIP	270	5%	1/8W (EXCEPT CA30/GA35/SA33)
R411	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R412	1-216-075-00	METAL CHIP	12K	5%	1/10W
R413	1-249-410-11	CARBON	270	5%	1/4W (GF85/SP100)
R414	1-216-085-00	METAL CHIP	33K	5%	1/10W (GF85/SP100)
R415	1-216-035-00	METAL CHIP	270	5%	1/10W (GF85/SP100)
R416	1-247-837-91	CARBON	1.8K	5%	1/4W (EXCEPT GA65)
R416	1-249-420-11	CARBON	1.8K	5%	1/4W (GA65)
R417	1-216-184-00	RES, CHIP	270	5%	1/8W (GF85/SP100)
R418	1-216-055-00	METAL CHIP	1.8K	5%	1/10W
R419	1-216-184-00	RES, CHIP	270	5%	1/8W (CA30/GA35: PL, TW/GA55PL/GF85: PL, TW/SA33)
R420	1-249-421-11	CARBON	2.2K	5%	1/4W
R421	1-216-184-00	RES, CHIP	270	5%	1/8W (EXCEPT CA30/GA35/SA33)
R422	1-216-073-00	METAL CHIP	10K	5%	1/10W
R423	1-216-073-00	METAL CHIP	10K	5%	1/10W
R424	1-216-222-00	RES, CHIP	10K	5%	1/8W
⚠R601	1-260-364-11	CARBON	1M	5%	1/2W
R602	1-249-441-11	CARBON	100K	5%	1/4W
R603	1-249-441-11	CARBON	100K	5%	1/4W
R604	1-247-883-00	CARBON	150K	5%	1/4W
R605	1-249-439-11	CARBON	68K	5%	1/4W
R606	1-216-017-91	RES, CHIP	47	5%	1/10W
R607	1-216-093-91	RES, CHIP	68K	5%	1/10W
R608	1-249-411-11	CARBON	330	5%	1/4W
R609	1-215-927-41	METAL OXIDE	47K	5%	3W
R610	1-215-889-00	METAL OXIDE	330	5%	2W F
R611	1-216-047-91	RES, CHIP	820	5%	1/10W
R612	1-216-341-11	METAL OXIDE	0.22	5%	1W F
R613	1-216-073-00	METAL CHIP	10K	5%	1/10W
R614	1-249-415-11	CARBON	680	5%	1/4W
R615	1-216-047-91	RES, CHIP	820	5%	1/10W
R616	1-216-049-00	METAL CHIP	1K	5%	1/10W
R617	1-216-166-00	RES, CHIP	47	5%	1/8W
R618	1-249-408-11	CARBON	180	5%	1/4W
R619	1-216-655-11	METAL CHIP	1.5K	0.5%	1/10W
R620	1-260-091-11	CARBON	220	5%	1/2W
R621	1-216-655-11	METAL CHIP	1.5K	0.5%	1/10W
R622	1-247-807-31	CARBON	100	5%	1/4W
R901	1-249-412-11	CARBON	390	5%	1/4W
R902	1-216-023-00	METAL CHIP	82	5%	1/10W (EXCEPT CA30/GA35/SA33)
R903	1-247-804-11	CARBON	75	5%	1/4W
R904	1-216-051-00	METAL CHIP	1.2K	5%	1/10W (EXCEPT CA30/GA35: PL, TW/GA55PL/GF85: PL, TW/SA33)
R904	1-216-057-00	METAL CHIP	2.2K	5%	1/10W (CA30/GA35: PL, TW/GA55PL/GF85: PL, TW/SA33)
R905	1-216-049-00	METAL CHIP	1K	5%	1/10W
R906	1-216-089-00	METAL CHIP	47K	5%	1/10W
R907	1-216-089-00	METAL CHIP	47K	5%	1/10W
R908	1-216-041-00	METAL CHIP	470	5%	1/10W (GF85/SP100)
R908	1-216-295-00	METAL CHIP	0	5%	1/10W (EXCEPT GF85/SP100)
R909	1-216-041-00	METAL CHIP	470	5%	1/10W (GF85/SP100)
		< MODULATOR >			
⚠RFU901	1-473-226-13	MODULATOR, RF (RFU-2043) (EXCEPT CA30/GA35: PL, TW/GA55PL/GA65/GF85: PL, TW/SA33)			
⚠RFU901	1-473-240-11	MODULATOR, RF (RFU-1048) (CA30/GA35: PL, TW/GA55PL/GF85: PL, TW/SA33)			
⚠RFU901	1-473-637-31	MODULATOR, RF (RFU-2025) (GA65)			
		< VARIABLE RESISTOR >			
RV101	1-223-239-11	RES, ADJ, CARBON 10K			
RV102	1-223-239-11	RES, ADJ, CARBON 10K (GF85/SP100)			
		< SWITCH >			
S101	1-571-958-11	SWITCH, PUSH (1 KEY) (REC PROOF) (EXCEPT GA65)			
S101	1-762-108-11	SWITCH, PUSH (1 KEY) (REC PROOF) (GA65)			
S102	1-771-155-11	SWITCH, ROTARY (CAM ENCODER)			
S401	1-762-196-21	SWITCH, TACT (I /⏻)			
S402	1-762-196-21	SWITCH, TACT (■ STOP)			
S403	1-762-196-21	SWITCH, TACT (▷ PLAY)			
S404	1-762-196-21	SWITCH, TACT (▶▶ FF)			
S405	1-762-196-21	SWITCH, TACT (❚❚ PAUSE)			
S406	1-762-196-21	SWITCH, TACT (● REC) (EXCEPT CA30/GA35/SA33)			
S407	1-762-196-21	SWITCH, TACT (◀◀ REW)			
S408	1-762-196-21	SWITCH, TACT (SYNCHRO REC) (EXCEPT CA30/GA35/SA33)			
S410	1-571-588-21	SWITCH, SLIDE (CONNECT LINE-1) (EXCEPT CA30/GA35/SA33)			
		< TRANSFORMER >			
T371	1-433-494-11	BIAS OSCILLATION TRANSFORMER (EXCEPT CA30/GA35/SA33)			
⚠T601	1-435-137-11	TRANSFORMER (RCC), CONVETER			
		< VARISTOR >			
⚠VDR601	1-801-267-31	VARISTOR TNR10V431K660			
		< VIBRATOR >			
X101	1-767-855-11	VIBRATOR, CRYSTAL (10MHz)			
X201	1-760-708-11	VIBRATOR, CRYSSTAL (4. 433619MHz) (EXCEPT CA30/GA35: PL, TW/GA55PL/GF85: PL, TW/SA33)			
* X202	1-760-709-11	VIBRATOR, CRYSTAL (3. 579545MHz) (EXCEPT GA35: ME, PS, SG, TH)			

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref. No.	Part No.	Description	Remark
		MISCELLANEOUS	
		**********	
8	1-791-514-11	CABLE, FLAT (FFM-32)	
55	1-791-515-11	CABLE, FLAT (FDM-8)	
⚠57	1-777-850-51	CORD, POWER (EXCEPT CA30/GA35: PL, TW/ GA55PL/GF85: PL, TW/SA33)	
⚠57	1-777-956-11	CORD, POWER (CA30/GA35: PL, TW/ GA55PL/GF85: PL, TW/SA33))	
704	1-500-144-11	HEAD, FE	
768	1-772-147-11	DRUM ASSY, DZH-71E-R (CA30/GA35TW/SA33)	
768	1-772-148-11	DRUM ASSY, DZH-89B-R (GA35: ME, PL, PS, SG, TH/GA55/SP70)	
768	1-772-149-11	DRUM ASSY, DZH-91B-R (GF85: PS, TH/SP100)	
768	1-772-351-11	DRUM ASSY, DZH-90B-R (GF85PL)	
M902	1-698-971-11	MOTOR, DC (CAPSTAN)	
M903	X-3947-577-1	MOTOR ASSY, CAM	
		**********	
		HARDWARE LIST	
		**********	
#1	7-685-648-79	SCREW +BVTP 3X12 TYPE2 IT-3	
#2	7-682-147-01	SCREW +P 3X6	
#3	7-685-646-79	SCREW +BVTP 3X8 TYPE2 IT-3	
#4	7-685-133-19	SCREW (DIA. 2.6) (IT 3B)	
		ACCESSORIES & PACKING MATERIALS	
		**********	
	1-418-631-11	COMMANDER, STANDARD (RMT-V286) (EXCEPT CA30/GA35/GF85TW/SA33)	
	1-418-631-21	COMMANDER, STANDARD (RMT-V286A) (GA35: ME, PL, PS, SG, TH)	
	1-418-779-11	COMMANDER, STANDARD (RMT-V286B) (GF85TW)	
	1-418-779-21	COMMANDER, STANDARD (RMT-V286C) (CA30/GA35TW/SA33)	
	1-575-334-11	CORD, CONNECTION (STEREO AV) (1.5m) (GF85/SP100)	
⚠	1-569-008-21	ADAPTOR, CONVERSION 2P (GA35ME/GA55ME/GA65)	
	1-696-592-11	CORD, CONNECTION (NTSC) (1.5m) (CA30/GA35: PL, TW/GA55PL/ GF85: PL, TW/SA33)	
	1-696-593-11	CORD, CONNECTION (PAL) (1.5m) (EXCEPT CA30/GA35: PL, TW/GA55PL/ GF85: PL, TW/SA33)	
	3-709-269-01	COVER, BATTERY (for RMT-V286/V286A)	
	3-867-577-11	MANUAL, INSTRUCTION (ENGLISH) (GA35: ME, PS, SG, TH/ GA55: ME, PS, SG,TH/GA65)	
	3-867-577-21	MANUAL, INSTRUCTION (ARABIC) (GA35: ME, SG/GA55: ME, SG/GA65)	
	3-867-577-31	MANUAL, INSTRUCTION (PERSIAN) (GA35: ME, SG/GA55: ME, SG/GA65)	
	3-867-577-41	MANUAL, INSTRUCTION (URDUH) (GA35: ME, SG/GA55: ME, SG/GA65)	
	3-867-577-51	MANUAL, INSTRUCTION (RUSSIAN) (GA35: PS, SG/GA55: PS, SG)	
	3-867-577-61	MANUAL, INSTRUCTION (THAI) (GA35TH/GA55TH)	
	3-867-578-11	MANUAL, INSTRUCTION (ENGLISH) (CA30/GA35: PL, TW/GA55PL/SA33)	
	3-867-579-11	MANUAL, INSTRUCTION (ENGLISH) (SP70)	
	3-867-579-21	MANUAL, INSTRUCTION (RUSSIAN) (SP70)	
	3-867-580-11	MANUAL, INSTRUCTION (ENGLISH) (GF85: PS, TH)	
	3-867-580-21	MANUAL, INSTRUCTION (THAI) (GF85TH)	
	3-867-581-11	MANUAL, INSTRUCTION (ENGLISH) (SP100)	
	3-867-581-21	MANUAL, INSTRUCTION (RUSSIAN) (SP100)	
	3-868-052-11	MANUAL, INSTRUCTION (ENGLISH) (GF85: PL,TW)	
	3-868-278-11	MANUAL, INSTRUCTION (CHINESE) (CA30/GA35TW/GF85TW/SA33)	
*	3-961-581-01	SHEET, PROTECTION (CA30/GA35/GA55: ME, PS, SG, TH /GF85/SA33/SP100)	

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